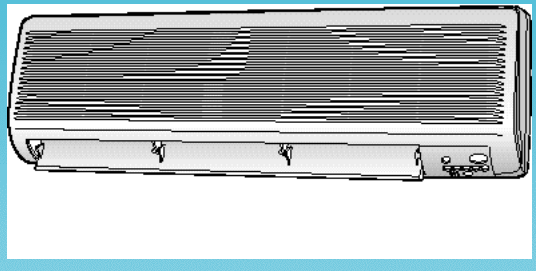
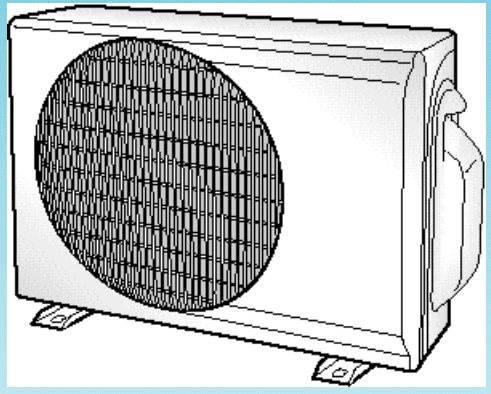
ROOM AIR CONDITIONER

INDOOR UNIT	OUTDOOR UNIT
AQV12A1ME	UQV12A1ME
AQV12A2ME	UQV12A2ME
SH12VA1	SH12VA1X
SH12VA2	SH12VA2X
AQV09A1ME	UQV09A1ME
AQV09A2ME	UQV09A2ME
SH12VA1	SH09VA1X
SH12VA2	SH09VA2X

SERVICE Manual

AIR CONDITIONER





CONTENTS

1. Precautions

2. Product Specifications

3. Operating Instructions and Installation

4. Disassembly and Reassembly

5. Troubleshooting

6. Exploded Views and Parts List

7. PCB Diagrams

8. Wiring Diagrams

1. Precautions

1. Warning: Prior to repair, disconnect the power cord from the circuit breaker.

2. Use proper parts: Use only exact replacement parts. (Also, we recommend replacing parts rather than repairing them.)

3. Use the proper tools: Use the proper tools and test equipment, and know how to use them. Using defective tools or test equipment may cause problems later-intermittent contact, for example.

4. Power Cord: Prior to repair, check the power cord and replace it if necessary.

5. Avoid using an extension cord, and avoid tapping into a power cord. This practice may result in malfunction or fire.

6. After completing repairs and reassembly, check the insulation resistance. Procedure: Prior to applying power, measure the resistance between the power cord and the ground terminal. The resistance must be greater than 30 megohms.

7. Make sure that the grounds are adequate.

8. Make sure that the installation conditions are satisfactory. Relocate the unit if necessary.

9. Keep children away from the unit while it is being repaired.

10. Be sure to clean the unit and its surrounding area.

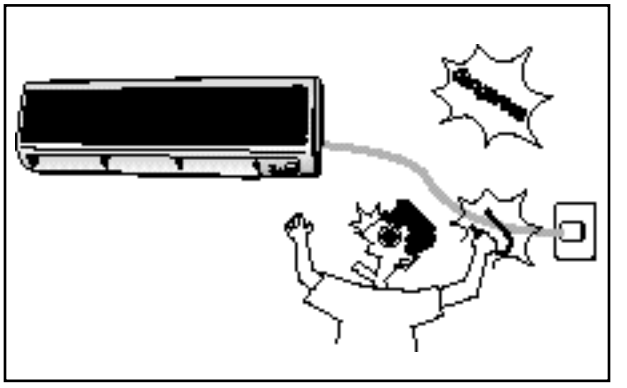


Fig. 1-1 Avoid Dangerous Contact

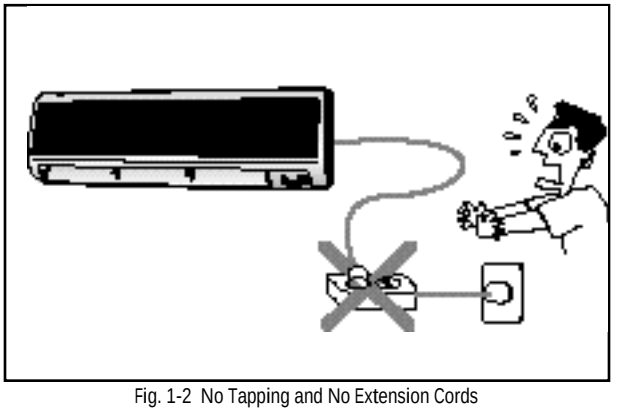


Fig. 1-2 No Tapping and No Extension Cords

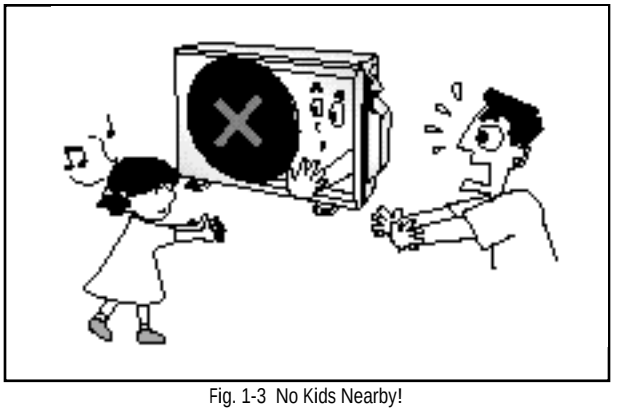


Fig. 1-3 No Kids Nearby!

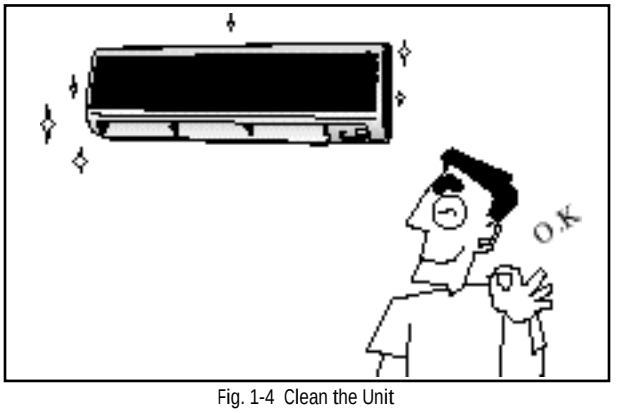


Fig. 1-4 Clean the Unit

MEMO

2. Product Specifications

2-1 Table

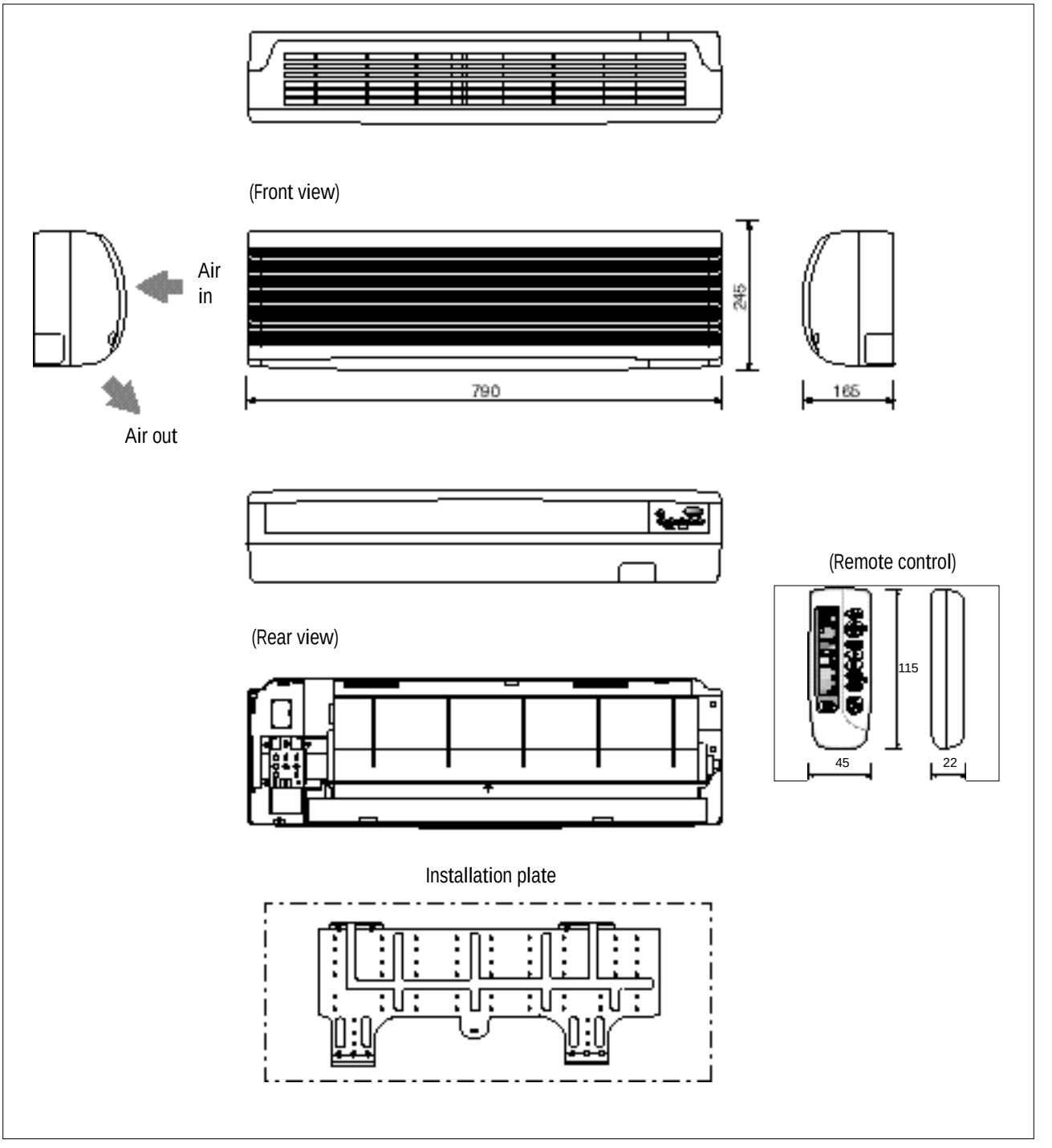
Item \ Model(Indoor/Outdoor)				AQV12A1ME/UQV12A1ME AQV12A2ME/UQV12A2ME SH12VA1/SH12VA1X SH12VA2/SH12VA2X	AQV09A1ME/UQV09A1ME AQV09A2ME/UQV09A2ME SH09VA1/SH09VA1X SH09VA2/SH09VA2X	Remark
Power Source			Ø-V-Hz	1-220/240-50	1-220/240-50	
Perfor-mance	Cooling	Capacity	W	3500(2300~3950)	2630(1870~2930)	
			Btu/h	12000(8000~13500)	9000(6400~10000)	
		Energy efficiency ratio	Btu/wh	9.1(11.0~7.8)	9.8(11.7~8.4)	
		Air Flow	m^3/min	7.9	7.9	
		Moisture removal	L/h	1.9	1.5	
		Noise level Indoor	dBA	35~39	33~37	
		Outdoor		50	50	
	Heating	Capacity	KW	3800(2300~4680)	2930(1750~3370)	
			Btu/h	13000(8000~16000)	10000(6000~11500)	
		Energy efficiency ratio	Btu/wh	9.0(11.4~7.5)	10.0(12.0~9.4)	
		Air Flow	m^3/min	7.9	7.9	
		Noise level Indoor	dBA	34~38	32~36	
		Outdoor		50	50	
Electrical Rating	Available voltage range		V	187~264	187~264	
	Cooling	Running amperes	A	5.9(3.6~7.4),MAX12A↓	4.0(2.7~5.3),MAX7A↓	
		Power input	W	1310(760~1690)	900(540~1140)	
		Power factor	%	98.0(94.0~99.0)	94.0(89.0~96.0)	
	Heating	Running amperes	A	6.3(3.5~9.1),MAX12A↓	4.9(2.8~5.7),MAX7A↓	
		Power input	W	1410(740~2080)	1000(510~1230)	
		Power factor	%	98.0(92.0~99.0)	91.0(84.0~95.0)	
	Starting current		A	12↓	12↓	
	Fuse capacity		AxV	3.15x250 / 15x250	3.15x250 / 15x250	
	Power cord		AxV	15 x 250	15 x 250	
	Cable-connector		mm^3xG	1.5 x 4	1.5 x 4	
Com-pressor	Type		-	Single Rotary	Single Rotary	
	Model name		-	48A135RV1JL	44B092QV1JL	
	Safety devices		-	204CT	204CT	
Fan motor	Indoor	Model name	-	AMPFS-022WTVA	AMPFS-022WTVA	
		Running capacitor	µF x VAC	1.2µF / 450V	1.2µF / 450V	
	Outdoor	Model name	-	AMASS-020WTVB	AMASS-020WTVB	
		Running capacitor	µF x VAC	1.2µF / 450V	1.2µF / 450V	
Refrigerant tube		Narrow tube : Liquid	mmxMT	OD 6.35 x 5	OD 6.35 x 5	
		Wide tube : Gas	mmxMT	OD 12.7 x 5	OD 9.52 x 5	
Capillary tube		Cooling	mm	ID 1.7 x 800	ID 1.5 x 1000	
		Heating	mm	ID 1.7 x 400	ID 1.7 x 400	
Refrigerant to charge (R22)			gr	880	690	
Dimension		Indoor unit : WXHXD	mm	790x245x165	790x245x165	
		Outdoor unit : WXHXD	mm	720x532x245	720x532x245	
Weigth		Indoor unit	Kg	7.7	7.7	
		Outdoor unit	Kg	41.0	37.0	

Remark : Text condition

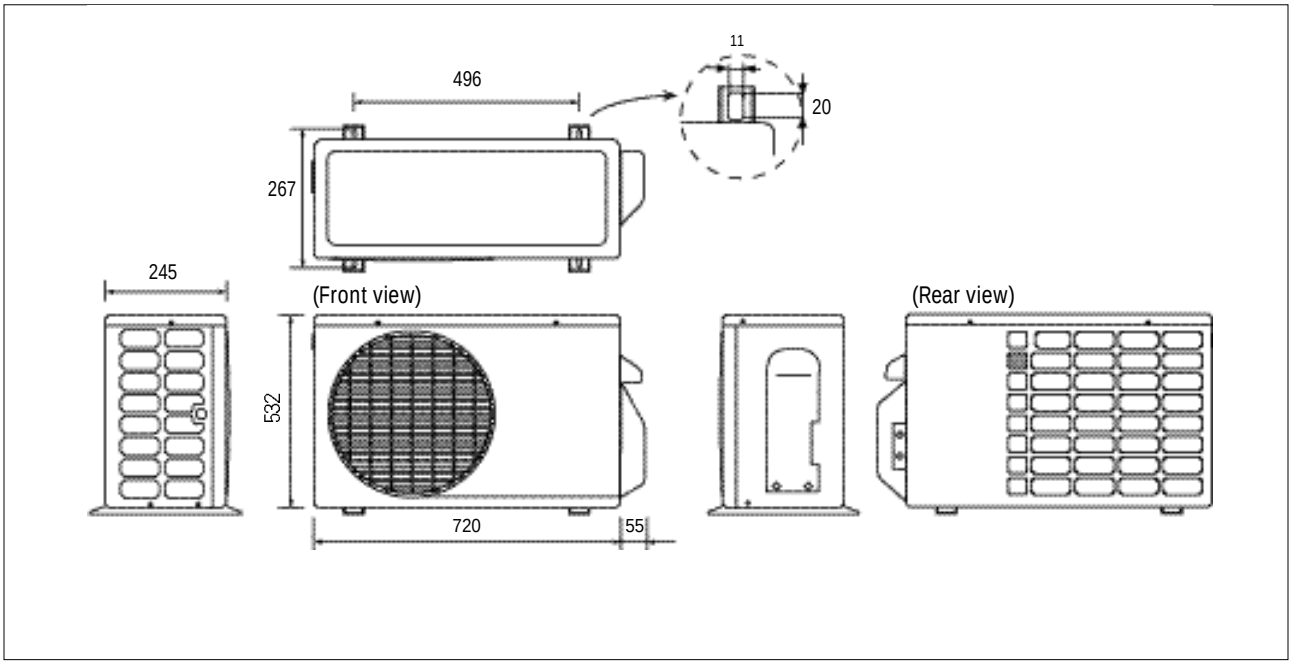
	Indoor room	Outdoor room
Cooling test	DB27˚C / WB19˚C	DB35˚C / WB24˚C
Heating test	DB20˚C /	DB 7˚C / WB 6˚C

2-2 Dimensions

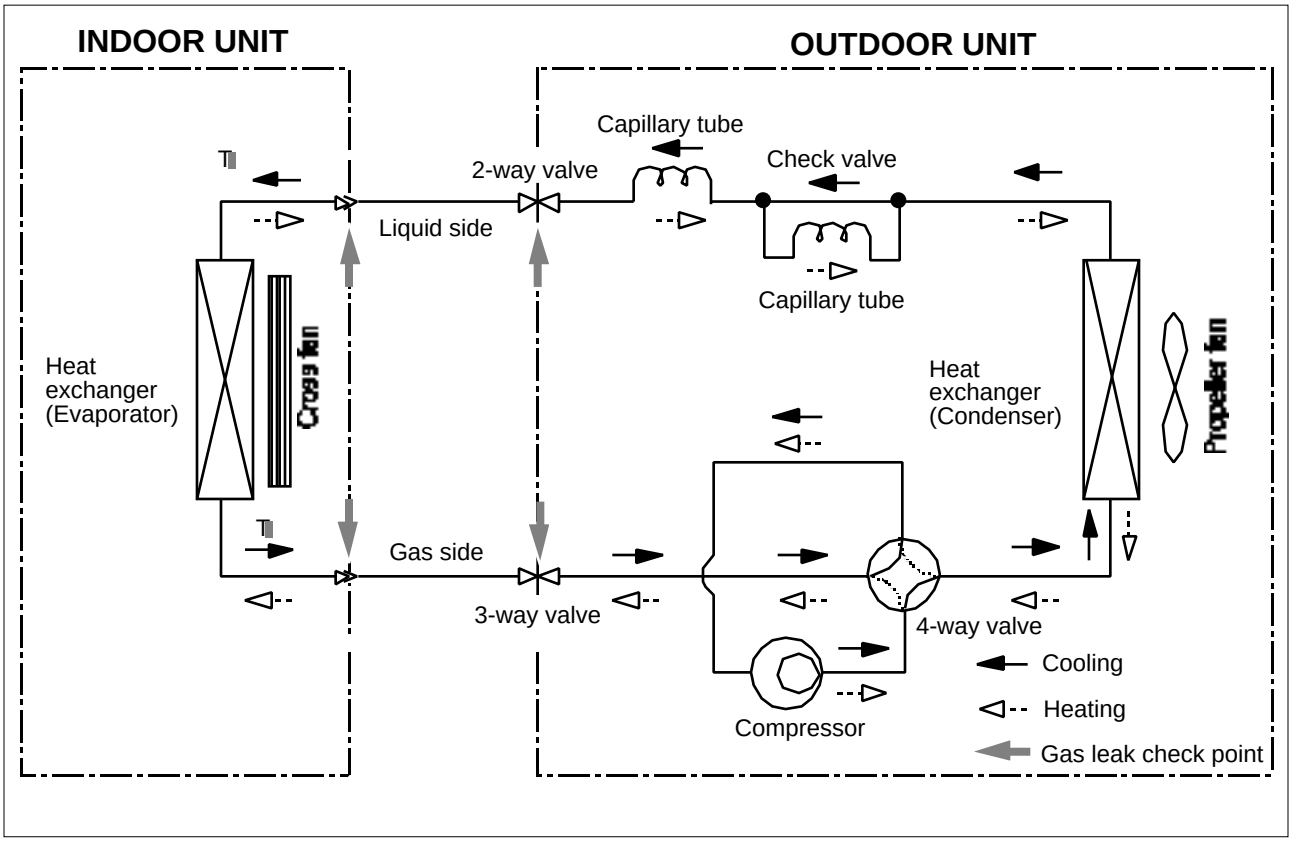
2-2-1 Indoor Unit



2-2-2 Outdoor Unit



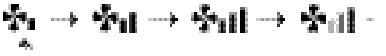
2-3 Refrigerating Cycle Block Diagram



3. Operating Instructions and Installation

3-1 Operating Instructions

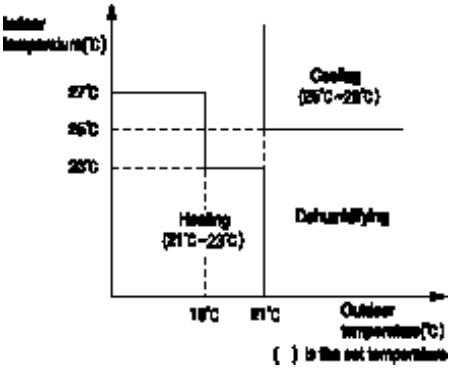
3-1-1 Name & Function of Key in remote controller

NO	NAMED OF KEY	FUNCTION OF KEY
1		Power On/Off button to start and stop airconditioner or timer set up
2	(UP)	Temp. up button. To increase the temperature by the pressing the temperature button
	(DOWN)	Temp. down button. To decrease the temperature by the pressing the temperature button
3		Each time you press this button Mode is changed in the following order : Auto Mode : Fan Only : Cool Mode : Heat Mode : Dry Mode
4		Press until the appearance. the air condition cools or heats the room as quickly as possible. after 30minutes, the airconditioner is reset automatically to the previous mode
		Press until the appearance. the sleep timer can be used when you are cooling or heating your room to switch the air conditioner off automatically after a period of six hours.
5		Each time you press this button, FAN SPEED is changed in the following order. 
6		Adjust air flow vertically.
7		The ON Timer enables you to **switch on** the air conditioner automatically after a given period of time that is from 30 minutes to 24 hours. To cancel the On Time, press the (Set/Cancel) button.
8		The Off Timer enables you to **switch off** the air conditioner automatically after a given period of time that is from 30 minutes to 24 hours. To cancel the On Time, press the (Set/Cancel) button.
9		To select the 5 way function with the remote control, press the 5 way button one or more times until the desired mode is selected.. Each time you press the 5 way button Each 5 way indicator on the indoor unit comes on order.

3-1-2 Name & Function

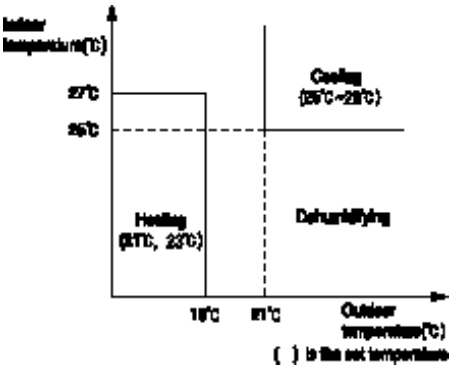
1. AUTO CHANGEOVER FUNCTION :
   *To operate in the “Auto change over” mode when set at “AUTO”mode.
   *According to the outdoor and indoor temperatures while starting the operation, one of the modes from the cooling, dehumidifying and heating is selected automatically to operate.
   *The operation mode shall be set again if the other condition different from that of the operating conditions(cooling, heating, dehumidifying mode) is kept for 60 minutes during the change-over operation.

   1) Mode selection for operation start



Outdoor temperature	Indoor temperature	Operation type	Set temperature	Wind volume
21˚C over	31˚C over 29˚C over 31˚C less 27˚C over 29˚C less 25˚C over 27˚C less	Cooling	28˚C 27˚C 26˚C 25˚C	Automatic
21˚C over	25˚C less	Dehumidifying	to be set automatically by controller according to the indoor temperature at the operation start.	
18˚C over 21˚C less	23˚C over			
18˚C less	27˚C over			
18˚C over 21˚C less	23˚C less	Heating	to be set automatically by controller according to the indoor temperature at the operation start.	
18˚C less	27˚C less		23˚C 21˚C	

   2) Mode selection during the operation



Outdoor temperature	Indoor temperature	Operation type	Set temperature	Wind volume
21˚C over	31˚C over 29˚C over 31˚C less 27˚C over 29˚C less 25˚C over 27˚C less	Cooling	28˚C 27˚C 26˚C 25˚C	Automatic
21˚C over	25˚C less	Dehumidifying	to be set automatically by controller according to the indoor temperature at the operation start.	
18˚C over 21˚C less	All area			
18˚C less	27˚C over			
18˚C less	21˚C over 23˚C less 21˚C less	Heating	23˚C 21˚C	

2. COOL MODE : The unit operates according to the difference between the setting and room temperature. (18°C~30°C)

3. HEAT MODE : The unit operates according to the difference between the setting and room temperature.(16°C~30°C)
   *Prevention against cold wind : For about 3~5 minutes after initial operation, thermo control or “de-ice”, the indoor fan will either not operate or operate very slowly, then switch to the selected fan speed. This period is to allow the indoor unit's heat-exchanger to prewarm before emitting

warm air.
*High temperature release function : The outdoor unit for and compressor ON / OFF control for safety operation, when the over-heat is heat exchanger of indoor unit.
*De-ice : Deicing operation is controlled by indoor unit's heat exchanger temperature and accumulating time of compressor's operation.
De-ice end by sensing of the processing time by de-ice Condition.

4. DRY MODE :
*According to the difference between the set temperature (Ts) and indoor temperature (Tr), the operation frequency of compressor as per area is controlled.
(Cooling area / COMP^{or} ON / OFF area / Monitoring area)
➟ Cooling area : same as the cool mode
➟ COMP^{or} ON / OFF area : repeatation of COMP^{or} frequency 36[Hz] for 4 minutes operation / 0[Hz](off) for 6 minutes
➟ Monitoring area : COMP^{or} off.

5. TURBO MODE : This mode is available in AUTO, COOL, HEAT, DRY, FAN MODE.
When this button is pressed at first, the air conditioner is operated “powerful” state for 30 minutes regardless of the set temperature, room temperature.
When this button is pressed again, or when the operating time is 30 minutes, turbo operation mode is canceled and returned to the previous mode.
*But, if you press the TURBO button in DRY or FAN mode that is changed with AUTO mode automatically.

6. SLEEP MODE : Sleep mode is available only in COOL or HEAT mode.
The operation will stop after 6 hours.
*In COOL mode : The setting temperature is automatically raised by 1°C each 1hour
When the temperature has been raised by total of 2°C, that temperature is maintained.
*In HEAT mode : The setting temperature is automatically droped by 1°C each 1hour.
When the temperature has been droped by total of 2°C, that temperature is maintained.

7. FAN SPEED : Manual (3 step), Auto (4 step)
Fan speed automatically varies depending on both the difference between setting and the room temperature.

8. COMPULSORY OPERATION :
For operating the air conditioner without the remote controller.
*AUTO : The operating is the same function that AUTO MODE in the remote controller. And each time you press the button the 5WAY function is changed as follow.
STD → NATURE → POWER → SAVING → SILENCE → POWER OFF
Each time you press This button, 5WAY function is changed in the following order
STD(standard) → NATURE → POWER(High-speed) → Saving(Power-Saving) → SILENCE
❊ STD(standard)( ) : General operation Mode
❊ NATURE( ) : The unit is operated according to health pattern control
❊ POWER( ) : The unit is operated in powerful state
❊ SAVING( ) : The unit is operated in power saving state
❊ SILENCE( ) : The unit is operated quitely
Each mode has Auto, Cool and SLEEP operation designed in advarce.

9. SWING : BLADE-H is rotated vertically by the stepping motor.
   *Memory louver : When ON / OFF button is pressed at stop state, the BLADE-H returns to its original location which is operating state before stop
   *Swing Set : Press the button under the remote control is displayed on LCD the and the blades move up and down. If the one more time press the button, blade location is stop.

10. 24-Hour ON / OFF Real Setting Timer. : The air conditioner is turned ON at a specified time using
    OFF TIMER : The air Conditioner is turned OFF at a specified time using
    *ON TIMER : Only timer LED lights on.
    *OFF TIMER : Both timer and operation LED lights on.

11. SELF Diagnosis

Indoor unit

LAMP of Display Monitor						Description
						● : Lamp on ◎ : Lamp flickering X : Lamp off
TIMER	STD	NATURE	POWER	SAVING	SILENCE	
◎	X	X	X	X	X	Indoor unit room temperature sensor error(open or short)
◎	◎	X	X	X	X	Indoor unit heat exchanger temperatute sensor error(open or short)
X	X	◎	X	X	X	Indoor fan motor mal function
◎	◎	◎	X	X	X	EEPROM error
◎	◎	◎	◎	◎	◎	option error
X	◎	◎	X	X	X	Outdoor unit temperature sensor error (open or short) - outdoor temp-sensor - deice temp-sensor - OLP temp-sensor - discharge temp-sensor - heatsink temp-sensor
◎	X	◎	X	X	X	Abnormal communication (Indoor - Outdoor unit)
X	X	X	◎	X	X	Abnormal increase of operation current
X	X	◎	◎	X	X	Abnormal increase of discharge and OLPtemperature
◎	X	X	◎	X	X	Over current of IPM circuit
X	◎	◎	◎	X	X	Trouble of the PTC circuit of the outdoor
◎	X	◎	◎	X	X	Trouble of AC current sensor (open / short) and Leakage of refrigerant(R-22)

Outdoor unit

LAMP of inverter PBA			Description ● : Lamp on ◎ : Lamp flickering X : Lamp off
Yellow	Blue	Red	
X	◎	●	Normal operation and communication (Indoor - Outdoor unit)
X	X	●	Abnormal communication (Indoor - Outdoor unit)
X	X	X	Trouble of the control power of the outdoor
◎	X	X	Abnormal increase of heatsink temperature
◎	X	●	Abnormal increase of discharge temperature
◎	●	X	Abnormal increase of operation current
◎	●	●	Abnormal increase of OLPtemperature
X	X	◎	Over current of IPM circuit
X	●	◎	Over voltage of IPM circuit
●	◎	●	Over voltage and current of PFC circuit
●	X	◎	Trouble of option setting
◎	◎	X	Trouble of discharge temp-sensor (open / short)
◎	◎	●	Trouble of AC current sensor (open / short) and Leakage of refrigerant(R-22)
◎	X	◎	Trouble of outdoor temp-sensor (open / short)
◎	●	◎	Trouble of deice temp-sensor (open / short)
X	◎	◎	Trouble of heatsink temp-sensor (open / short)
●	◎	◎	Trouble of DC link voltage circuit
◎	◎	◎	Trouble of OLPtemp - sensor (open / short)

12. BUZZER SOUND : Whenever the ON / OFF button is pressed or whenever change occurs to the condition which is set up or select, the compulsory operation mode, buzzer is sounded "beep"

3-2 Installation

3-2-1 Selecting Area for Installation

Select an area for installation that is suitable to the customer's needs.

3-2-1(a) Indoor Unit

1. Make sure that you install the indoor unit in an area providing good ventilation. It must not be blocked by an obstacle affecting the airflow near the air inlet and the air outlet.
2. Make sure that you install the indoor unit in an area allowing good air handling and endurance of vibration of the indoor unit.
3. Make sure that you install the indoor unit in an area where there is no source of heat or vapor nearby.
4. Make sure that you install the indoor unit in an area from which hot or cool air is spread evenly in a room.
5. Make sure that you install the indoor unit in an area away from TVs, audio units, cordless phones, fluorescent lighting fixtures and other electrical appliances (at least 1 meter).
6. Make sure that you install the indoor unit in an area which provides easy pipe connection with the outdoor unit, and easy drainage for condensed water.
7. Make sure that you install the indoor unit in an area which is large enough to accomodate the measurements shown in figure on the next page.

3-2-1(b) Outdoor Unit

1. Make sure that you install the outdoor unit in area not exposed to the rain or direct sun light.
   (Install a separate sunblind if exposed to direct sun light.)
2. Make sure that you install the outdoor unit in area allowing good air moment, not amplifying noise or vibration, especially to avoid disturbing neighbours.
   (Fix the unit firmly if it is mounted in a high place.)
3. Make sure that you install the outdoor unit in area providing good ventilation and which is not dusty. It must not be blocked by any obstacle affecting the airflow near the air inlet and the air outlet.
4. Make sure that you install the outdoor unit in area free from animals or plants.
5. Make sure that you install the outdoor unit in area not blocking the traffic.
6. Make sure that you install the outdoor unit in area easy to drain condensed water from the indoor unit.
7. Make sure that you install the outdoor unit in area which provides easy connection within the maximum allowable length of a coolant pipe(15 meters).

   Note
   1. Add 20 grams of refrigerant (R-22) for every 1 meter if the pipe length exceeds the standard pipe length of 5 meters.
   2. Maintain a height between the indoor and outdoor units.
8. Make sure that you install the outdoor unit in an area which is large enough to accommodate the measurements

3-2-1(c) Remote Control Unit

1. Make sure that you install the remote control unit in an area free from obstacles such as curtains etc, which may block signals from the remote control unit.
2. Make sure that you install the remote control unit in an area not exposed to direct sunlight, and where there is no source of heat.
3. Make sure that you install the remote control unit in an area away from TVs, audio units, cordless phones, fluorescent lighting fixtures and other electrical appliances (at least 1 meter).

Caution :
It is harmful to the air conditioner if it is used in the following environments: greasy areas (including areas near machines), salty areas such as coast areas, areas where sulfuric gas is present such as hot spring areas. Contact your dealer for advice.

3-2-2(a) Refrigerant Refill

• Refill an air-conditioner with refrigerant when refrigerant has been leaked at installing or using

1. Purge air(for new installation only).

↓

2. Turn the 3-way valve clockwise to close, connect the pressure gauge(low pressure side) to the service valve, and open the 3-way valve again.

↓

3. Connect the tank to refill with Refrigerant

↓

4. Set the unit to Low pressure checking mode.
   * Press the ON/OFF switch for 5 second.
   *All lamps blink on the indoor unit.

↓

5. Check the pressure indicated by the pressure gauge(low pressure side).
   * Refer to Low pressure graph.

↓

6. Open the refrigerant tank and fill with refrigerant until the rated pressure is reached.
   * It is recommended not to pour the refrigerant in too quickly, but gradually while operating a pressure valve.

↓

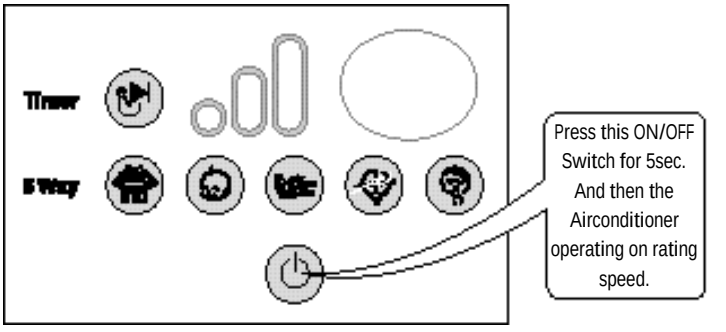
7. Stop operation of the air conditioner.

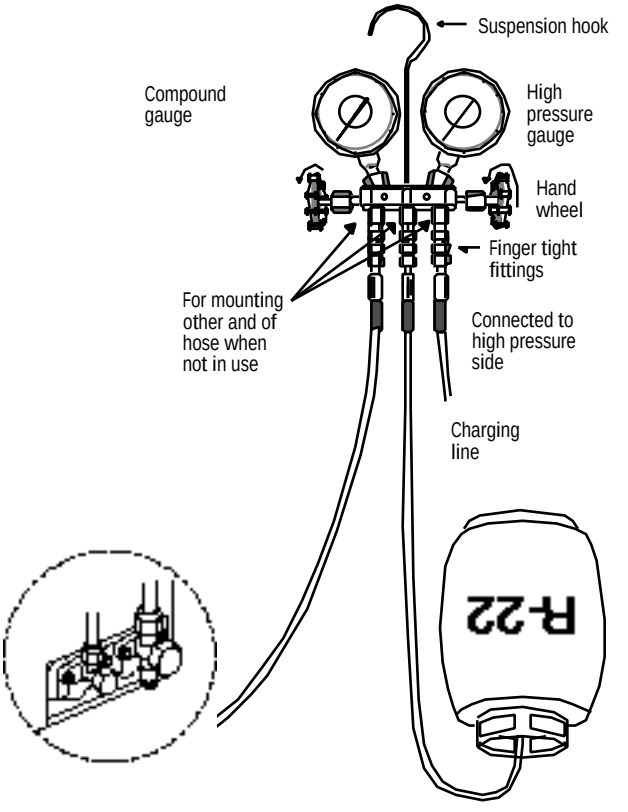
↓

8. Close the 3-way valve, disconnect the pressure gauge, and open the 3-way valve again.

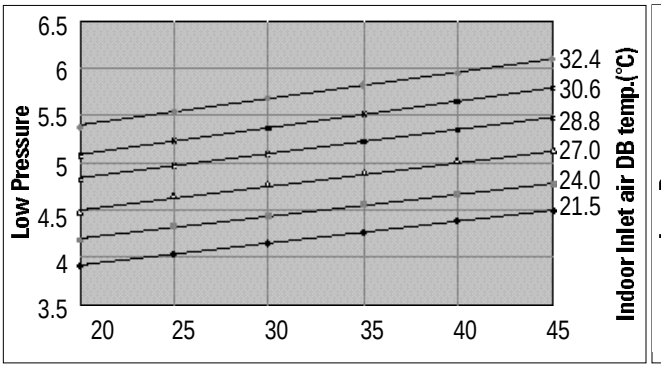
↓

9. Close the cap of each valve.

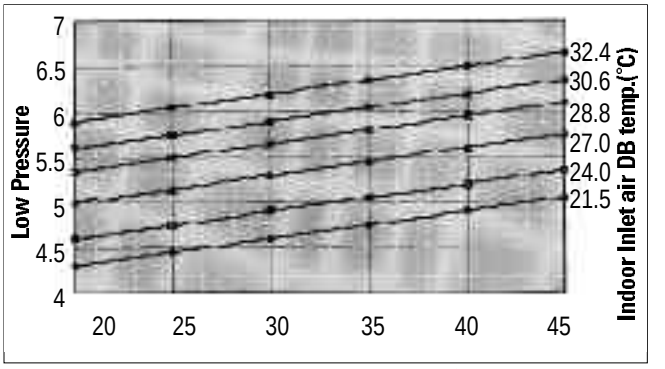




• MODEL NAME : AQV12A1ME (UQV12A1ME)
AQV12A2ME (UQV12A2ME)
SH12VA1(SH12VA1X)
SH12VA2(SH12VA2X)



• MODEL NAME : AQV09A1ME (UQV09A1ME)
AQV09A2ME (UQV09A2ME)
SH09VA1(SH09VA1X)
SH09VA2(SH09VA2X)



3-2-2(b) Refrigerant Adjustment

Class	For installation		For service	
Connection Pipe Length	Air-Purge Method	Refrigerant Adjustment	Air-Purge Method	Refrigerant Quantity
5m (standard)	Refer to the detailed Air-Purge Procedure	Unnecessary	Purge air using a vaccum pump or an additional refrigerant cylinder.	refer to specification sheet
6~15m		Add 20g of refrigerant (R-22) for every 1m.		Add 20g of refrigerant (R-22) for every 1m.

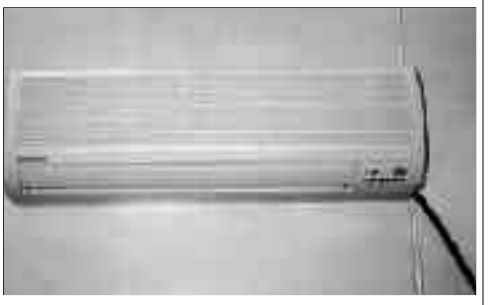
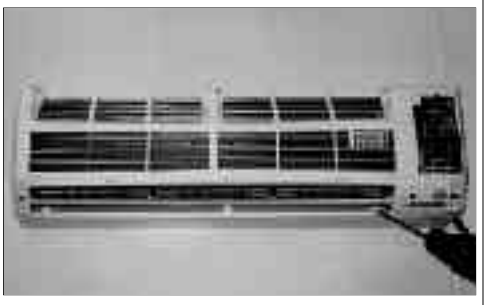
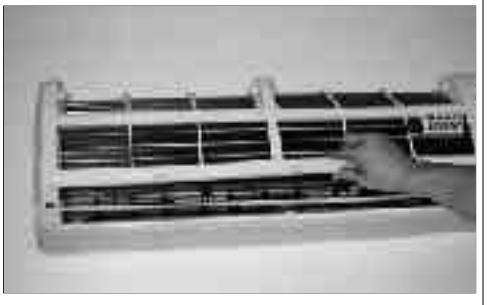
3-2-2(c) Flare unt fixing torque

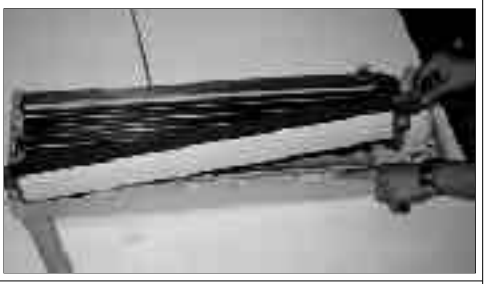
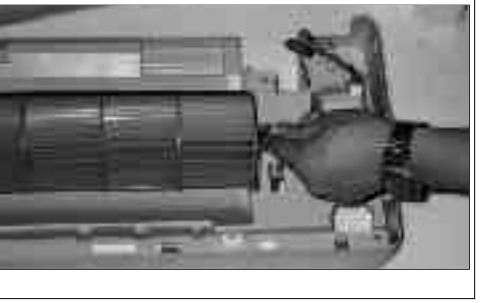
Outter diameter	Torque (kg-cm)	
	Fixing Torque	Final Torque
ø 6.35 (9000Btu, 12000Btu) (Liquid Side)	160	200
ø 9.52 (9000Btu) (Gas Side)	300	350
ø 12.7 (12000Btu) (Gas Side)	500	550

4. Disassembly and Reassembly

Stop operation of the air conditioner and remove the power cord before repairing the unit.

4-1 Indoor Unit

No	Parts	Procedure	Remark
1	Front Grille	1) Stop the air conditioner operation and block the main power. 2) Seperate tape of front panel upper.	
		3) Contract the second finger to the left, and right handle and pull to open the inlet grille. 4) Take the left and right filter out. *Taking off the deodorizing filter. 5) Loosen one of the right fixing screw and seperate the terminal cover. 6) Loosen three fixing screws of front grille.	 
		7) Pull the upper left and right of discharge softly for the outside cover to be pulled out. 8) Pull softly the lower part of discharge and push it up. **Caution;** Assemble the front panel and fix the hooks of left and right.	

No	Parts	Procedure	Remark
2	Ass'y Tray Drain.	1) Do "1"above 2) Take all the connector of PCB upper side out. (Inclusion Power cord) 3) Separate the outdoor unit connection wire from the terminal block. 4) If pulling the Main PCB up. it will be taken out.	
3	Electrical Parts (Main PCB)	1) Do "1", "2", above Separate the drain hose from the extension drain hose. 2) Pull tray drain out from the back body.	
4	Heat Exchanger	1) Do "1" and "2", "3", above 2) Loosen two fixing earth screws of right side. 3) Separate the connection pipe. 4) Separate the holder pipe at the rearside. 5) Loosen the three fixing screws of right and left side. 6) Lifting the heat exchanger up a little to push the up side for separation from the indoor unit.	
5	Fan Motor and Cross Fan	1) Do "1" "2" "3" "4", above. 2) Loosen the fixing two screws and separate the motor holder. 3) Loosen the fixing screw of fan motor. (By use of M3 wrench) 4) Separate the fan motor from the fan. 5)Separate the fan from the left holder bearing.	 

4-2 Outdoor Unit

Take care of the electrical shock by contact on the charging parts before the discharge after power off. (If takes approximately 2minutes to discharge.)

No	Parts	Procedure	Remark
1	Common Work & Ass'y-control Out	1) Loosen the fixing screw and separate the Cover-Valve. 2) Separate the Cable-Connector Wire from the Terminal-Block.	
		3) Loosen five fixing screws and separate the Cabi-Upper. 4) Loosen five fixing screws from the Ass'y-Control Out.	
		5) Separate the Terminal-Housing from the Ass'y-Control Out. 6) Separate the Ass'y-Control Out from the outdoor unit.	
		7) Loosen seven fixing screws and separate the Cabi-Side.	

No	Parts	Procedure	Remark
2	Fan-Motor	1) Loosen Four fixing screw of the Guard-Fan. 2) Remove the nut flange (Turn to the right to remove, as it is a left hand screw) 3) Separate the fan. 4) Loosen four fixing screws to separate the motor.	
3	Heat Exchanger	1) Do “1”, above. 2) Loosen three fixing screws of Ass’y-Frame and Partition. 3) Disassemble the inlet and outlet pipe by welding. 4) Separate the heat exchanger.	

No	Parts	Procedure	Remark
4	Compressor	1) Do “1”, above. 2) Open the terminal cover of compressor and unscrew the connection terminal. 3) Disassemble the inlet and outlet pipe of compressor by welding. 4) Disassemble the inlet and outlet pipe of condenser by welding	
		5) Loosen the three bolts of the lower part. 6) separate the compressor.	

5. Troubleshooting

Since the inverter air conditioner is equipped with Electrical control circuits at both Indoor & outdoor unit, the trouble shooting shall be performed according to the error mode.
Inside the controller of the outdoor unit (inverter), the large capacity of electrolytic condenser so that it takes the time to discharge after the power off since the electrical charge remains (the charging voltage DC 340V).
Take care of the electrical shock by contact on the charging part before the discharge after the power off. (It takes approximately 2 minutes to discharge).

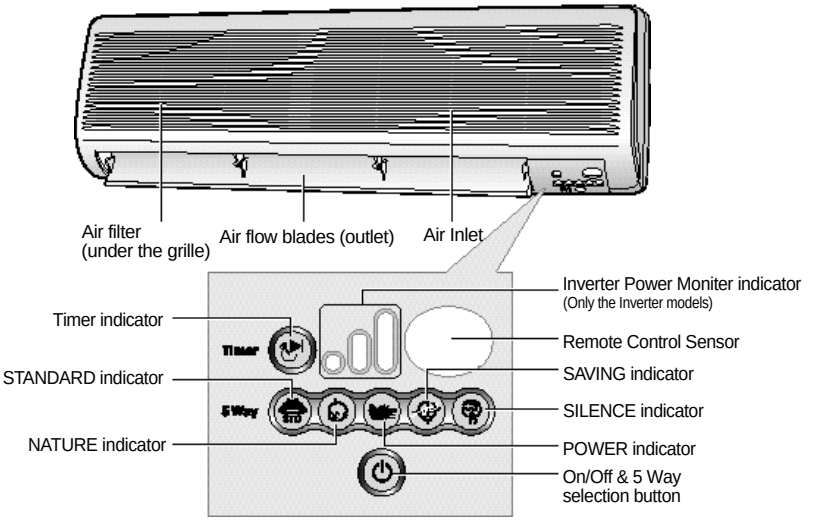
5-1 Basic items for trouble shooting

1) Is the power source proper?
   The power source shall be in the range of the rated voltage ±10% If it is out of this range, it may cause the abnormal operation.
2) Is the connection made between the indoor and outdoor unit?
   The connection between indoor and outdoor unit shall be performed with 4 wire. (connection cable of indoor and outdoor unit + ground wire).
3) The phenomena as follows are not out of order.

NO	Phenomena	Cause and reason
1	The operation is not done.	• Is the power off or the power unplugged? • Does it stop because it is the completion time? • Unplug and plug again the power source for 2 minutes.
2	The wind comes out but the heating/cooling is not performed.	• Is the filter clogged with dust or dirty? • Is there any direct light on the outdoor unit or any obstacle against it? • Is the selected temperature too high? Lower the selected temperature lower than the current one (during cooling). • Is the selected temperature too low? Raise the desired temperature than the current one? • Is the “Fan only Mode” operation?
3	The remote controller does not operate.	• Is the battery run out? • Is the battery inserted in the wrong way(+, -)? • Is the detection part of the indoor unit blocked? • Does it interfered with the radio of neon sign?
4	The wind volume is not adjusted.	• Is the operation selected among one of Auto / Dry / Turbo / Sleeping? • The temperature setting is not required since the wind volume set automatically. • Check again at the state of Cooling / Fan only / Heating.
5	The temperature is not set.	• Is the operation selected among the Dry / Turbo / Sleeping / Fan only Mode. Since the temperature is automatically set, the temperature setting is not required. • Check again at the cooling/heating state. • The standard temperature ±2˚C during the automatic operation.
6	The operation lamp continues to be flickering.	• Push the Operation / Stop button. • Unplug and plug the power source.
7	The immediate operation starts without control of remote controller when plugged	• It is the case that the auto restart function works. # Auto restart function is the convenient function where the operation state is memorized in the Memory IC during the blackout and the operation restarts when the power comes back.

5-2 The first determination method of troubled part

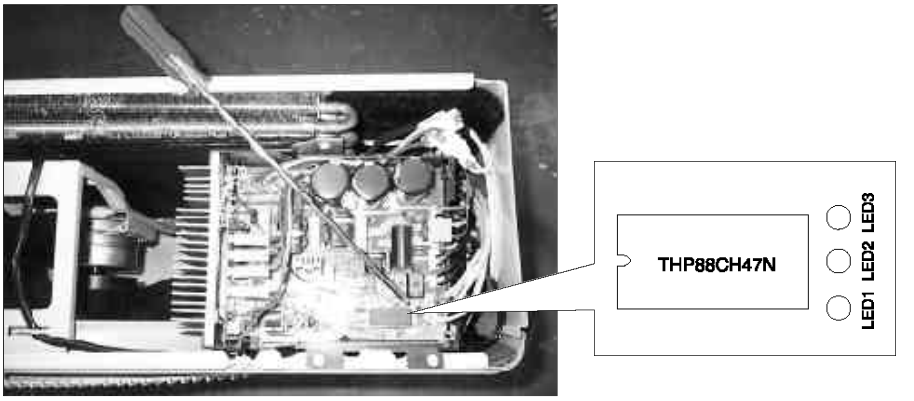
5-2-1 Error mode display of indoor unit



LAMP of Display Monitor						Description
Timer	STD	NATURE	POWER	SAVING	SILENCE	
◎	X	X	X	X	X	Indoor unit room temperature sensor error(open or short)
◎	◎	X	X	X	X	Indoor unit heat exchanger temperature sensor error (open or short)
X	X	◎	X	X	X	Indoor fan motor mal function
◎	◎	◎	X	X	X	EEPROM error
◎	◎	◎	◎	◎	◎	Option error
X	◎	◎	X	X	X	Outdoor unit temperature sensor error(open or short) - outdoor temp-sensor - deice temp-sensor - OLP temp- sensor - discharge temp-sensor - heatsink temp-sensor
◎	X	◎	X	X	X	Abnormal communication (Indoor - Outdoor unit)
X	X	X	◎	X	X	Abnormal increase of operation current
X	X	◎	◎	X	X	Abnormal increase of discharge and OLP temperature
◎	X	X	◎	X	X	Over current of IPM circuit
X	◎	◎	◎	X	X	Trouble of the PTC circuit of the outdoor
◎	X	◎	◎	X	X	Trouble of AC current sensor (open/short) and Leakage of refrigerant(R-22)

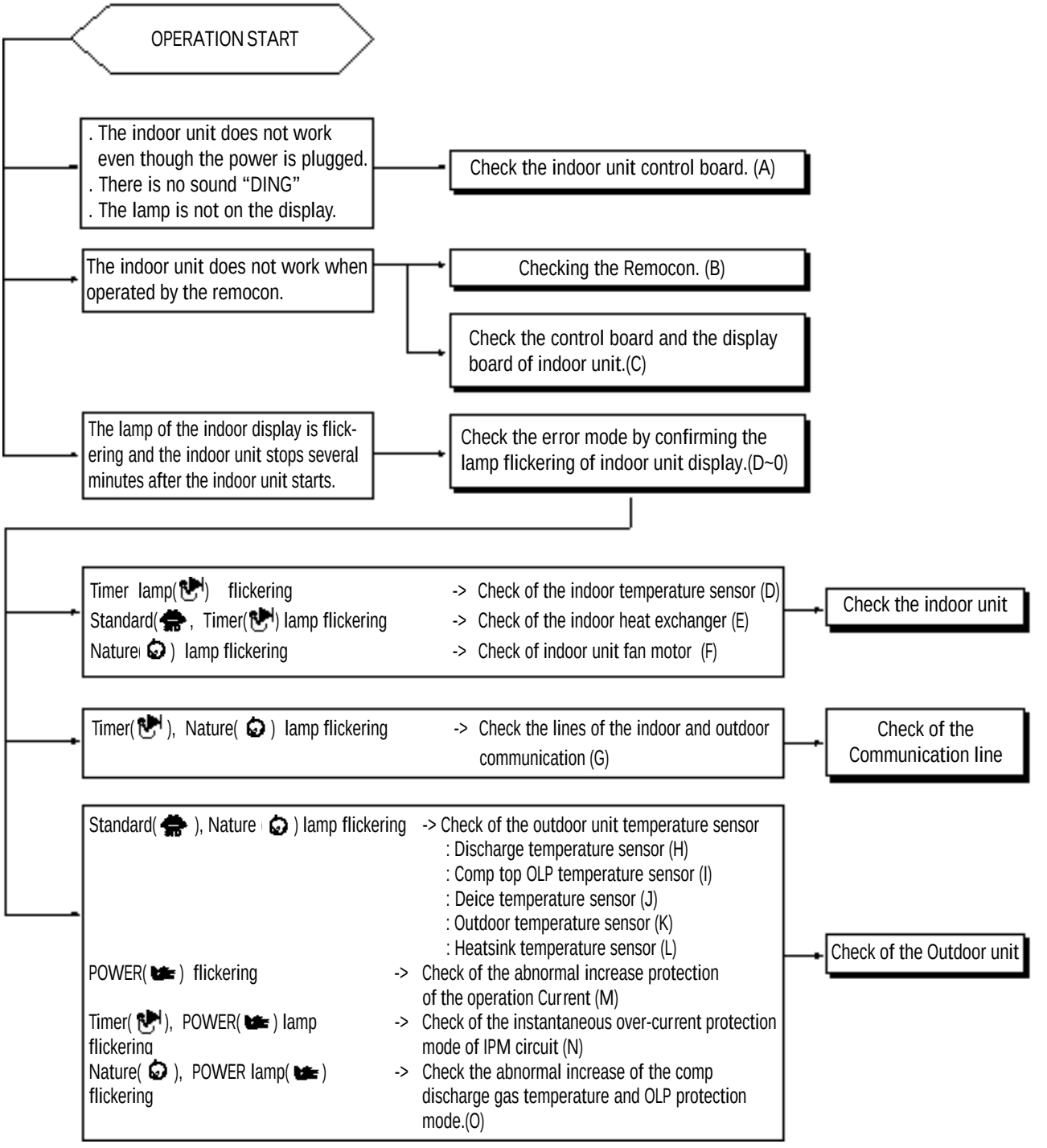
● : Lamp on
◎ : Lamp flickering
X : Lamp off

5-2-2 Error mode display of outdoor unit board



LAMP of inverter PBA			Description ● : LAMP ON ◎ : LAMP FLICKERING X : LAMP OFF
YELLOW	BLUE	RED	
X	◎	●	Normal operation and communication(Indoor - Outdoor unit)
X	X	●	Abnormal communication(Indoor - Outdoor unit)
X	X	X	Trouble of the control power of the outdoor
◎	X	X	Abnormal increase of heatsink temperature
◎	X	●	Abnormal increase of discharge temperature
◎	●	X	Abnormal increase of operation current
◎	●	●	Abnormal increase of OLP temperature
X	X	◎	Over current of IPM circuit
X	●	◎	Over voltage of IPM circuit
●	◎	●	Over voltage and current of PFC circuit
●	X	◎	Trouble of option setting
◎	◎	X	Trouble of discharge temp-sensor (open/short)
◎	◎	●	Trouble of AC current sensor (open/short)and Leakage of refrigerant(R-22)
◎	X	◎	Trouble of outdoor temp-sensor (open/short)
◎	●	◎	Trouble of deice temp-sensor (open/short)
X	◎	◎	Trouble of heatsink temp-sensor (open/short)
●	◎	◎	Trouble of DC link voltage circuit
◎	◎	◎	Trouble of OLP temp-sensor (open/short)

5-3 Sequence of trouble shooting for inverter aircon


OPERATION START
. The indoor unit does not work even though the power is plugged.
. There is no sound "DING"
. The lamp is not on the display.
Check the indoor unit control board. (A)
The indoor unit does not work when operated by the remocon.
Checking the Remocon. (B)
Check the control board and the display board of indoor unit.(C)
The lamp of the indoor display is flickering and the indoor unit stops several minutes after the indoor unit starts.
Check the error mode by confirming the lamp flickering of indoor unit display.(D~0)
Timer lamp( ) flickering -> Check of the indoor temperature sensor (D)
Standard(, Timer( ) lamp flickering -> Check of the indoor heat exchanger (E)
Nature( ) lamp flickering -> Check of indoor unit fan motor (F)
Check the indoor unit
Timer( ), Nature( ) lamp flickering -> Check the lines of the indoor and outdoor communication (G)
Check of the Communication line
Standard( ), Nature( ) lamp flickering -> Check of the outdoor unit temperature sensor
: Discharge temperature sensor (H)
: Comp top OLP temperature sensor (I)
: Deice temperature sensor (J)
: Outdoor temperature sensor (K)
: Heatsink temperature sensor (L)
POWER( ) flickering -> Check of the abnormal increase protection of the operation Current (M)
Timer( ), POWER( ) lamp flickering -> Check of the instantaneous over-current protection mode of IPM circuit (N)
Nature( ), POWER lamp( ) flickering -> Check the abnormal increase of the comp discharge gas temperature and OLP protection mode.(O)
Check of the Outdoor unit

5-3-1 (A) Check of indoor unit control board

▷ Unplug the power cord and plug it after 5 seconds.
▷ press the on / off switch located in indoor unit inside to operate the air conditioner.
• If the air conditioner operates, check the remocon and indoor unit display board.
• If the air conditioner does not operate, check according to the sequence of the followings:

▷ Check sequence of indoor unit control board

Step 1 : Check whether two wires of power cord (Sky-blue, brown) are connected correctly to the terminal block.
- Sky -blue : connected to "N"
- Brown : connected to "L"

Step 2: Check whether the wire connected to the terminal block is connected correctly to the control board.

(Control board)		(Terminal block)
TB73	WHT	(N1)
TB72	SKY-BLU	N
TB71	ORG	L
RY71	BRN	1
CN73	BLK	2

Step 3 : Check whether the fuse (F701)(F702) on the control board is normal. (3.15 [A] / 250[V]:F701) (1[A] / 250[V] : F702)
- If the fuse is broken, replace it with the new one.

Step 4 : check the output of SMPS on the control board.
- Input power AC187~AC264V—-IC 02 Input: DC 12V
  IC 02 output : DC 5V

5-3-2 (B)(C) Display board and remocon check of indoor unit

▷ Check whether the connection wire of Display board is correctly connected to CN91 connector.
▷ Check the voltage of remocon battery. - the voltage of one battery shall be higher than about 1.4 V, and then the remocon operates normally.
▷ Check whether the neon sign is on and the 3 wave long fluorescent lamp is on around the indoor unit. - After putting all lamps of the indoor out and then operate it by remocon. If it operates with the remocon, it is the abnormality due to the interference from the light of lamps. (Aircon unit is normal).

5-3-3 (D)(E) Check the indoor temperature sensor and indoor heat exchanger temperature sensor.

Take out the thermistor connected to the connector (CN41) of control board of indoor unit and measure the resistance between two wires and if it is same as follows: it is normal but if not, replace it.

Ambient temperature (°C)	15°C	20°C	25°C	30°C	35°C	40°C	
Resistance of thermistor [KΩ]	14.68	12.09	10	8.31	6.94	5.83	

5-3-4 (F) Check of indoor unit fan motor

▷ Check whether the wire of fan motor is connected to the connector of control board (CN42, CN71) of indoor unit.

▷ Check whether the error mode displays after the strong revolution for approximately 15 seconds since aircon is on.

-> In case the error mode displays after the fan motor is rotating for 15 seconds → Defect of HALL IC of fan motor and Control board

-> In case that the error mode displays without running of fan motor after 15 seconds. → Operate with the pin of SSR(SS71) short of indoor unit control board and then if the fan motor does not run, it is the fan motor defect.
If it rotates, it is the defect of control board (SS71, IC05, IC04).

5-3-5 (G) Check of communication line between the indoor unit and outdoor unit

(Communication error mode)

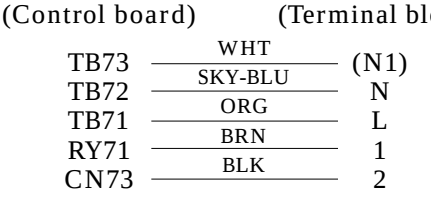
1) Check of connection

▷ Check whether the cable wire connecting the indoor unit with outdoor unit is correctly connected to the (N1), 1, 2 terminal. (If the wire is connected reversely, the communication error occurs)

▷ If the cable connecting the indoor unit and outdoor unit is longer than 20m, error mode occurs (shorten the cable length).

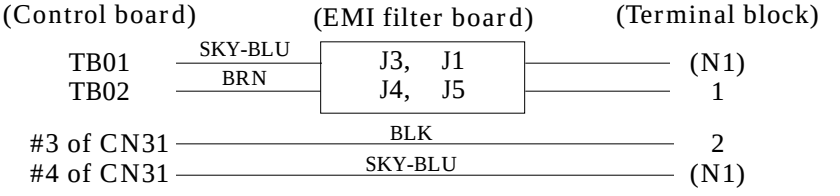
(Check of indoor unit)

▷ Check whether the connection wire of the terminal block and control board of indoor unit is correct.



(Check of outdoor unit)

▷ Check whether the connection wire of the terminal block and control board of outdoor unit is correct.



2) Check of power supply to the outdoor unit
After operation of aircon, select the turbo mode and approximately 3minutes later, check whether the red color lamp of control board (to be seen if the top cover of outdoor unit) is on.

-> If the red lamp (LED 3) is not on, check the power part of control board of outdoor unit.

♦ Check the connection of reactor.

-> If the red lamp (LED3) is on and green lamp is flickering, it is normal.

5-3-6 (H)(I) Check of discharge temperature sensor and comp top OLP temperature sensor.

▷ Connector of outdoor unit control board
(PIN#3,4 of CN51 - discharge temperature sensor), (PIN#1,2 of CN52-OLP Temperature sensor)
Measure the resistance between two wires and if it is same as follows, it is normal but if not, replace.

Ambient temperature (°C)	0°C	10°C	20°C	30°C	40°C	50°C	
Resistance of thermistor [KΩ]	553	362	242	166	165	82	

5-3-7 (J)(K) Check the defrost temperature sensor and outdoor temperature sensor

▷ Connector of outdoor unit control board
(PIN#1,2 of CN51 - outdoor temperature sensor),(PIN#3,4 of CN52-deice Temperature sensor)
Measure the resistance between two wires and if it is same as follows, it is normal but if not, replace it.

Ambient temperature (°C)	15°C	20°C	25°C	30°C	35°C	40°C	
Resistance of thermistor [KΩ]	14.68	12.09	10	8.31	6.94	5.83	

5-3-8 (L) Check the heatsink temperature sensor of IPM

▷ Connector of outdoor unit IPM board(CN02)
Measure the resistance between two wires and if it is same as follows, it is normal but if not, replace it.

Ambient temperature (°C)	15°C	20°C	25°C	30°C	35°C	40°C	
Resistance of thermistor [KΩ]	77.4	61.4	49.1	39.5	31.9	26	

5-3-9 (M) Check of operation current abnormal increase mode

▷ The operation abnormal current mode is the protection control for the safe operation by detecting the operation current of inverter aircon by the current sensor on the control board.
▷ If the operation current abnormal increase occurs,
- ♦ The ventilation is not good because the outdoor unit is installed wrong (the ambient temperature is higher than 50 °C)
  -> Reinstall the outdoor unit so that the good ventilation can be made.
- ♦ If the Refrigerant is overcharged.
  -> Check the amount of Refrigerant.
- ♦ If the comp is locked.
  -> Replace the comp.
- ♦ If the comp is operating without the revolution of fan motor.
  -> Check the fan motor connector, replace the fan motor.
- ♦ If the protection cover is operating with bending to the outdoor.
  -> Take out the protection cover.
- ♦ If two outdoor units are operating face to face. (the bad ventilation is made)
  -> Reinstall the outdoor unit for the good ventilation.
- ♦ The air circulation is bad due to the attachment of falling leaves
  -> Take away the leaves for the good ventilation.

Check the elements of current sensor block of the outdoor control board.
♦ R506 — 680Ω ♦ R507 — 1.8 KΩ ♦ R508 — 10 KΩ

5-3-10 (N) Check of instantaneous over-current protection of IPM circuit.

▷ Inverter instantaneous over-current protection mode is the mode to be actuated in order to prevent the damage of elements from the peak current of IPM circuit elements.
▷ In case that the inverter circuit instantaneous over-current protection mode actuates.

(condition of installation)

- ♦ The ventilation is not good because the outdoor unit is installed wrong (the ambient temperature is higher than 50 (°C))
  -> Reinstall the outdoor unit so that the good ventilation can be made.
- ♦ In case that the operation is made with the cover bent of the outdoor unit.
  -> Take out the cover.
- ♦ If two outdoor units are operating face to face, (the bad ventilation is made)
  -> Reinstall the outdoor unit for the good ventilation.
- ♦ The air circulation is bad due to the attachment of falling leaves.
  -> Take away the leaves for the good ventilation.
- ♦ If the Refrigerant is overcharged.
  -> Check the amount of Refrigerant.

(Unit defect)

- ♦ If the comp is locked.
  -> Replace the comp.
- ♦ If the comp is operating without the revolution of fan motor.
  -> Check the fan motor connector and replace the fan motor.
- ♦ In case the parts of the control board is damaged.
  -> Replace simultaneously the inverter control board and the IPM board.

5-3-11 (O) Check of the comp discharge gas temperature and OLP temperature abnormal rise.

▷ If the comp discharge gas temperature and OLP temperature rises higher than a certain level, it
▷ protects the circuit.
If the comp discharge gas temperature and OLP temperature rises abnormally,

(Condition of installation)

- ♦ The ventilation is not good because the outdoor unit is installed wrong (the ambient temperature is higher than 50 (°C))
  -> Reinstall the outdoor unit so that the good ventilation can be made.
- ♦ In case that the operation is made with the cover bent of the outdoor unit.
  -> Take out the cover.
- ♦ If two outdoor units are operating face to face, (the bad ventilation is made)
  -> Reinstall the outdoor unit for the good ventilation.
- ♦ The air circulation is bad due to the attachment of falling leaves
  -> Take away the leaves for the good ventilation.
- ♦ If the refrigerant is insufficient.
  -> Fill up the amount of refrigerant.

(Unit defect)

♦ If the comp is locked.
-> Replace the comp.

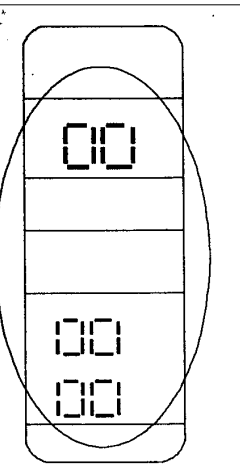
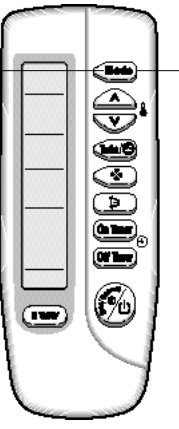
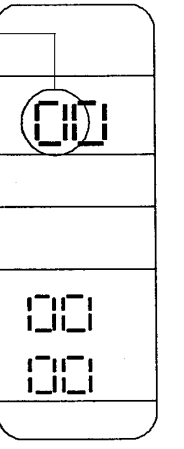
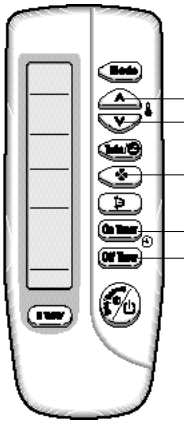
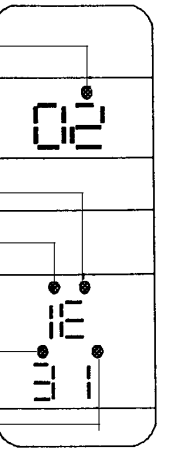
♦ If the comp is operating without the revolution of fan motor
-> Take out the protection cover.
-> Check the fan motor connector and replace the fan motor.

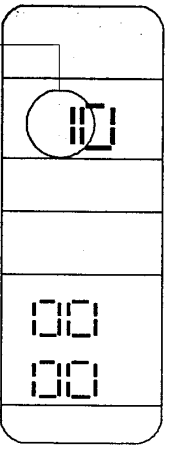
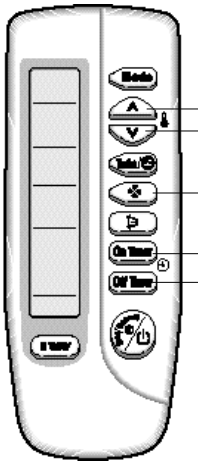
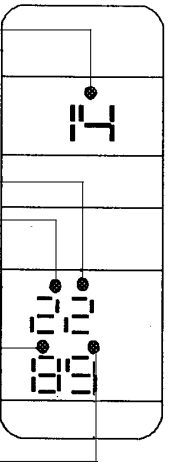
5-4 Fault Diagnosis of Major Parts

<table>
<tr><th>Parts</th><th colspan="2">Diagnosis</th></tr>
<tr><td rowspan="3">♦ Indoor "Temp.Sensor"
♦ Indoor "Heat ex. Sensor"
♦ Outdoor "Temp.Sensor"
♦ Outdoor "Deice Temp. Sensor"</td><td colspan="2">Measure resistance with a tester.</td></tr>
<tr><td>Normal</td><td>
<table>
<tr><td>Ambient temperature</td><td>15°C</td><td>20°C</td><td>25°C</td><td>30°C</td><td>35°C</td><td>40°C</td></tr>
<tr><td>Resistance of thermistor[KΩ]</td><td>14.68</td><td>12.09</td><td>10</td><td>8.31</td><td>6.94</td><td>5.83</td></tr>
</table>
</td></tr>
<tr><td>Abnormal</td><td>∞, 0 Ω … open or short</td></tr>
<tr><td rowspan="3">♦ Outdoor "Discharge Temp.Sensor"
♦ Outdoor "OLP Temp.Sensor"</td><td>Normal</td><td>
<table>
<tr><td>Ambient temperature</td><td>0°C</td><td>10°C</td><td>20°C</td><td>30°C</td><td>40°C</td><td>50°C</td></tr>
<tr><td>Resistance of thermistor[KΩ]</td><td>553</td><td>362</td><td>242</td><td>166</td><td>165</td><td>82</td></tr>
</table>
</td></tr>
<tr><td>Abnormal</td><td>∞, 0 Ω … open or short</td></tr>
<tr><td rowspan="5">Indoor Fan Motor</td><td colspan="2">Measure resistance between terminals (CN72) with a tester</td></tr>
<tr><td>Normal</td><td>At ambient temperature (10°C ~ 30°C)
<table>
<tr><td>between</td><td>Voltage</td><td></td></tr>
<tr><td>Red, Blue</td><td>410±10%</td><td>Main</td></tr>
<tr><td>Red, Yellow</td><td>325±10%</td><td>Sub</td></tr>
</table>
</td></tr>
<tr><td>Abnormal</td><td></td></tr>
<tr><td colspan="2">Measure the voltage between ground and signal wire of the fan motor</td></tr>
<tr><td>Normal</td><td>
<table>
<tr><td>between</td><td>Voltage</td></tr>
<tr><td>Gray, Orange</td><td>05V~4.5V</td></tr>
<tr><td>Yellow, Orange</td><td>5V</td></tr>
</table>
</td></tr>
<tr><td></td><td>Abnormal</td><td>Abnormal if voltage does not change from 0V to 5V.</td></tr>
<tr><td rowspan="2">Outdoor Fan Motor</td><td>Normal</td><td>At ambient temperature (10°C ~ 30°C)
<table>
<tr><td>between</td><td>Resistance</td><td></td></tr>
<tr><td>Black, Red</td><td>275±10%</td><td>Main</td></tr>
<tr><td>Black, White</td><td>350±10%</td><td>Sub</td></tr>
</table>
</td></tr>
<tr><td>Abnormal</td><td>∞, 0 Ω … open or short</td></tr>
<tr><td rowspan="3">Stepping Motor
(UP/DOWN swing motor)</td><td colspan="2">Measure resistance between red wire and each terminal.</td></tr>
<tr><td>Normal</td><td>Approx. 380Ω at ambient temperature (20°C ~30°C)</td></tr>
<tr><td>Abnormal</td><td>∞, 0 Ω … open or short</td></tr>
</table>

5-5 Set up the Model option

❋ If you make the replacement of the ASS'Y CONTROL-IN or MAIN PCB ,
Be sure to be set up the model option as follow the steps

Remote controller operation method as per the step	Applicable key	Display status
1st step Method) ① Remove the battery of remote controller ② Press the temperature raise/down key simultaneously ③ Insert the battery again (Result) If the screen of remocn displays as shown in the right, go to the second step		
2nd step Method) If the first digit of LCD is 0 on the remocon screen, go to the 3rd step. ❊ If it is 1, press the mode key once to change to 0 and go to the 3rd step.		
3rd step Method) Press the marked key to input the option number. example) 021E31 Result) Go to 4th step if it displays as shown in the right (The number increases from 1~9, and A, b, C, d, E, F whenever pressing the key.)		

Remote controller operation method as per the step	Applicable key	Display status
4th step Method) After completion of 3rd step, and if the MODE KEY is pressed once, 1. 1~3 steps are saved internally 2. If the first number at the time is "1", it is correct and so go to 5th step ❊ If pressing mode key and the first digit becomes 0, the screen of 1~3 steps can be seen.		
5th step Method) Pressing the marked key to input the option number. example) 142285 Result) If it displays as shown in the right go to the 6th step		
6th step Method) When pressing the operation ON/OFF key with the direction of remote controller for set, the sound "Ding, or Diriring is heard and then the input of option is completed. ❊ Refer to the right side if the error appears.	ERROR MODE 1. When the lamps of (STANDARD( ), NATURE( ), TIMER( ) is flickering → failute of option input After removing the set power cord and insert it again, pressing the operation on/off key to retry and if the condition is same, EPROM is deffcective or misinsertted. So replace the PCB.	2. When all lamps of indoor unit( ) are flickering with the sound of Dididiring, → The current option input is different from that of already input one: Check the option number correctly and if it is correct, press the key once more to input the option. (check correctly) → If the option is not input at the time and all lamps are continuously flickering ; since it is the case that the option number is out of the input range, check the option number again and do again the steps from 1 - 6steps

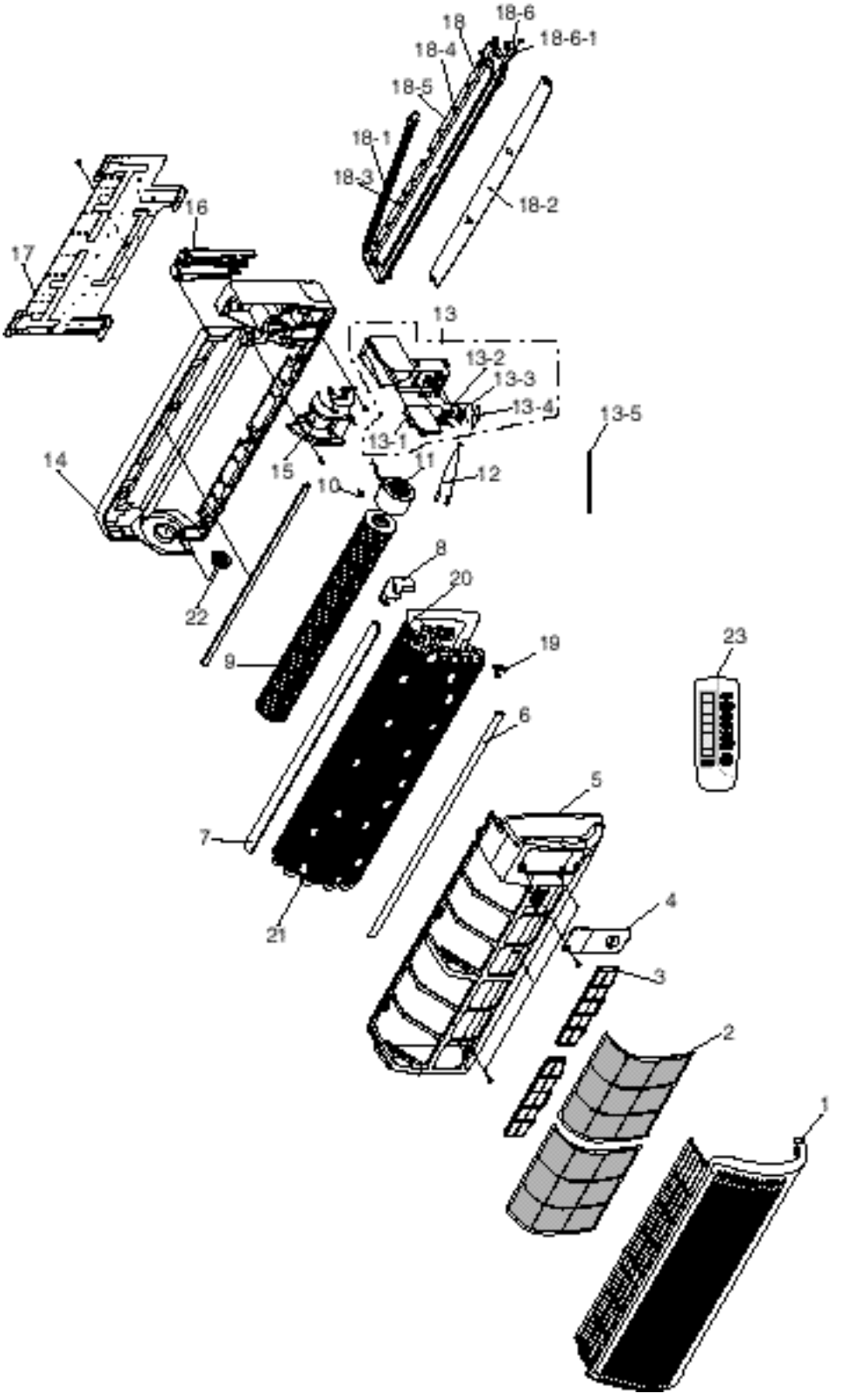
<Table of the option code>

MODEL	OPTION CODE
AQV12A2ME SH12VA2	005212-10123F
AQV09A2ME SH09VA2	006500-1010FB
AQV12A1ME SH12VA1	015212-10123F
AQV09A1ME SHO9VA1	016500-1010FB

MEMO

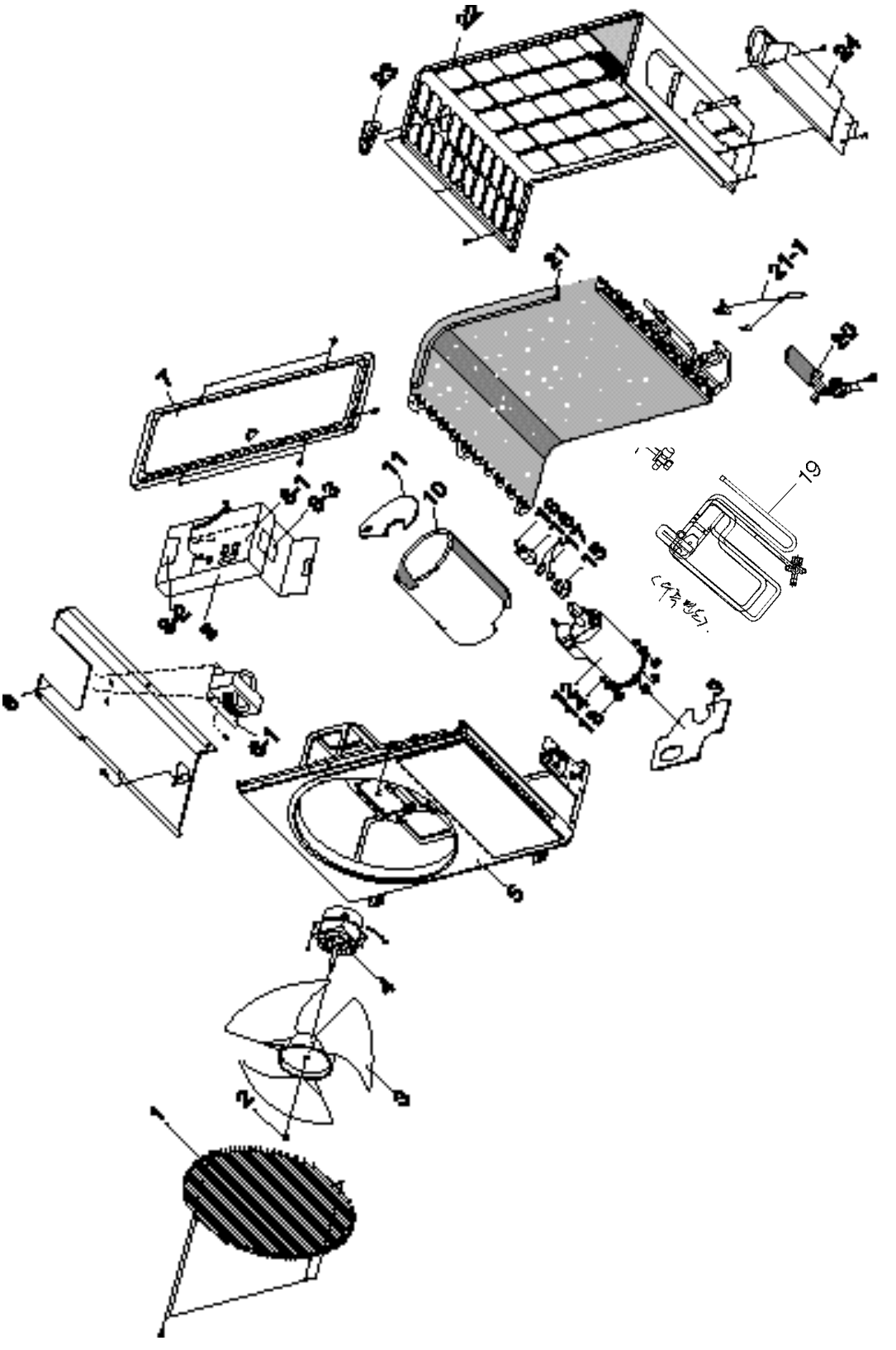
6. Exploded Views and Parts List

6-1 Indoor Unit



■ Parts List

No.	CODE NO	Description	Q'TY				Remark
			AQV12A1ME AQV12A2ME	SH12VA1 SH12VA2	AQV09A1ME AQV09A2ME	SH09VA1 SH09VA2	
1	DB64-00085A	GRILLE AIR INLET	1	1	1	1	
2	DB63-00064A	GUARD-AIR FILTER	2	2	2	2	
3	DB74-00011A	FILTER CLEANER ASS´Y	1	1	1	1	
4	DB63-00067A	COVER TEMINAL	1	1	1	1	
5	DB92-00031G	ASS´Y PANEL FRONT	1	1	1	1	
6	DB67-00051A	SPACER EVAP LOW	1	1	1	1	
7	DB67-00032A	SPACER EVAP UP	1	1	1	1	
8	DB63-00083A	COVER U BEND	1	1	1	1	
9	DB94-00040E	ASS´Y FAN CROSS	1	1	1	1	
10	DB60-20011A	BOLT SPECIAL	1	1	1	1	
11	DB31-00033A	MOTOR FAN IN	1	1	1	1	⚠
12	DB32-00020A	THERMISTOR WIRE ASS´Y	11	1	1	1	
13	DB93-00322A	ASS´Y CONTROL IN	1	1	1	1	⚠
13-1	DB93-00323A	ASS´Y PCB MAIN	1	1	1	1	⚠
13-2	DB65-00042A	TERMINAL BLOCK ASS´Y	1	1	1	1	⚠
13-3	DB61-00227A	HOLDER WIRE CLAMP	1	1	1	1	
13-4	DB93-00268B	ASS´Y PCB DISPLAY	1	1	1	1	⚠
13-5	DB39-00147A	CONNECT WIRE PCB	1	1	1	1	⚠
14	DB94-00019A	ASS´Y BACK BODY	1	0	1	0	
	DB94-00056A	ASS´Y BACK BODY	0	1	0	1	
15	DB61-00162A	HOLDER MOTOR	1	1	1	1	
16	DB61-00165A	HOLDER PIPE	1	1	1	1	
17	DB70-00036A	PLATE HANGER	1	1	1	1	
18	DB94-00017A	ASS´Y TRAY DRAIN	1	0	1	0	
	DB94-00058B	ASS´Y TRAY DRAIN	0	1	0	1	
18-1	DB94-00018A	ASS´Y DRAIN HOSE	1	1	1	1	
18-2	DB66-00042A	BLADE H	1	1	1	1	
18-3	DB66-00043A	BLADE V,A	3	3	3	3	
18-4	DB66-00043B	BLADE V,B	6	6	6	6	
18-5	DB63-00082A	SCREEN SAFETY WIRE	1	1	1	1	
18-6	DB95-20138A	ASS´Y MOTOR STEPPING	1	1	1	1	⚠
18-6-1	DB31-10129A	MOTOR STEPPING; GSP 24RW	1	1	1	1	⚠
19	DB61-40251A	HOLDER SENSOR	1	1	1	1	
20	DB67-60030A	SPRING SENSOR	1	1	1	1	
21	DB98-00717A	EVAPORATOR ASS´Y	1	1	0	0	
	DB75-00053A	"	0	0	1	1	
22	DB94-40003A	ASS´Y BEARING	1	1	1	1	
23	DB93-00251L	ASS´Y REMOCON	1	1	1	1	⚠

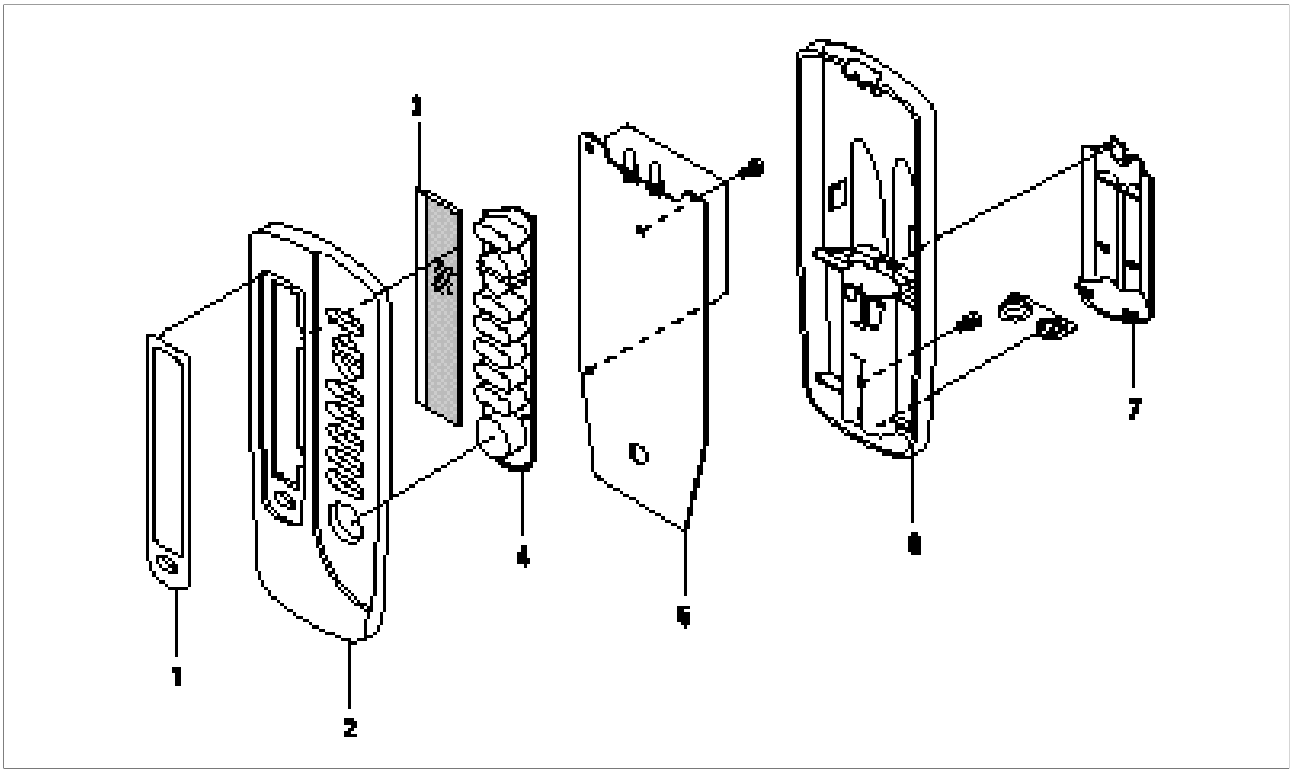


■ Parts List

No.	CODE NO	Description	Specification	Q'TY				Remark
				UQV12A1ME UQV12A2ME	SH12VA1X SH12VA2X	UQV09A1ME UQV09A2ME	SH09VA1X SH09VA2X	
1	DB90-00071A	GUARD-FAN	HSER	1	1	1	1	
2	DB60-30004A	NUT-FLANGE	2C SM20C M6 NTR	1	1	1	1	
3	DB67-50063A	PROPELLER-FAN	AS+G/F, ø405	1	1	1	1	
4	DB31-10058E	MOTOR-FAN OUT	AMASS-020WTVB	1	1	1	1	⚠
5	DB90-00147B	ASS'Y-FRAME	ASS'Y	1	1	0	0	
	DB90-00147A	ASS'Y-FRAME	ASS'Y	0	0	1	1	
6	DB94-00043H	ASS'Y-PARTITION	ASS'Y	1	1	0	0	
	DB94-00043G	ASS'Y-PARTITION	ASS'Y	0	0	1	1	
6-1	DB27-10037A	REACTOR	12A, 21mH	1	1	1	1	⚠
7	DB90-00150C	CABI-UPPER	SECC-P	1	1	1	1	
8	DB93-00325A	ASS'Y-CONTROL OUT	ASS'Y	1	1	1	1	⚠
8-1	DB93-00324A	ASS'Y-MAIN PCB-OUT	ASS'Y	1	1	1	1	⚠
8-2	DB93-00353A	ASS'Y IPM PCB	ASS'Y	1	1	1	1	⚠
8-3	DB93-00358A	ASS'Y EMI-filter PCB	ASS'Y	1	1	1	1	⚠
9	DB72-00196A	CLOTH-COMP BOTTOM	FELT	1	1	1	1	
10	DB72-00211A	CLOTH-COMP SIDE	FELT	1	1	0	0	
	DB72-00162A	CLOTH-COMP SIDE	FELT	0	0	1	1	
11	DB72-00231A	CLOTH-COMP UPPER	FELT	1	1	0	0	
	DB72-00255A	CLOTH-COMP UPPER	FELT	0	0	1	1	
12	48A135RV1JL	COMPRESSOR	48A135RV1JL	1	1	0	0	⚠
	44B092QV1JL	COMPRESSOR	44B092QV1JL	0	0	1	1	⚠
13	DB73-10004B	GROMMET-ISOLATOR	Silicon	3	3	3	3	
14	DB60-30029A	NUT-WASHER	HEX 2C MB ZPC	3	3	3	3	
15	DB63-20003A	GASKET	EPDM	1	1	1	1	
16	DB63-10034A	COVER-TERMINAL	NORYL	1	1	1	1	⚠
17	DB32-10043B	THERMISTOR-OLP	204CT / 103AT	1	1	1	1	⚠
18	DB60-30018A	NUT-FLANGE	M5, SM20C	1	1	1	1	
19	DB99-00026B	ASS´Y-4WAY VALVE	25kg/cm^{2}G	1	1	0	0	
	DB99-00039A	ASS´Y-4WAY VALVE	25kg/cm^{2}G	0	0	1	1	
20	DB99-00041A	ASS´Y-CHECK VALVE	ASS'Y	1	1	0	0	
	DB99-00040A	ASS´Y-CHECK VALVE	ASS'Y	0	0	1	1	
21	DB96-00279A	ASS´Y-CONDENSER	ASS'Y	1	1	0	0	
	DB96-00372A	ASS´Y-CONDENSER	ASS'Y	0	0	1	1	
21-1	DB32-10040A	THERMISTOR-OUT	204CT / 103AT	1	1	1	1	
22	DB64-00186A	CABI-SIDE	SECC-P	1	1	1	1	
23	DB67-90024A	HANDLE-CABI, LF	ABS	1	1	1	1	
24	DB63-00070A	COVER-VALVE	ABS	1	1	1	1	

6-3 Remote Control & PCB Box

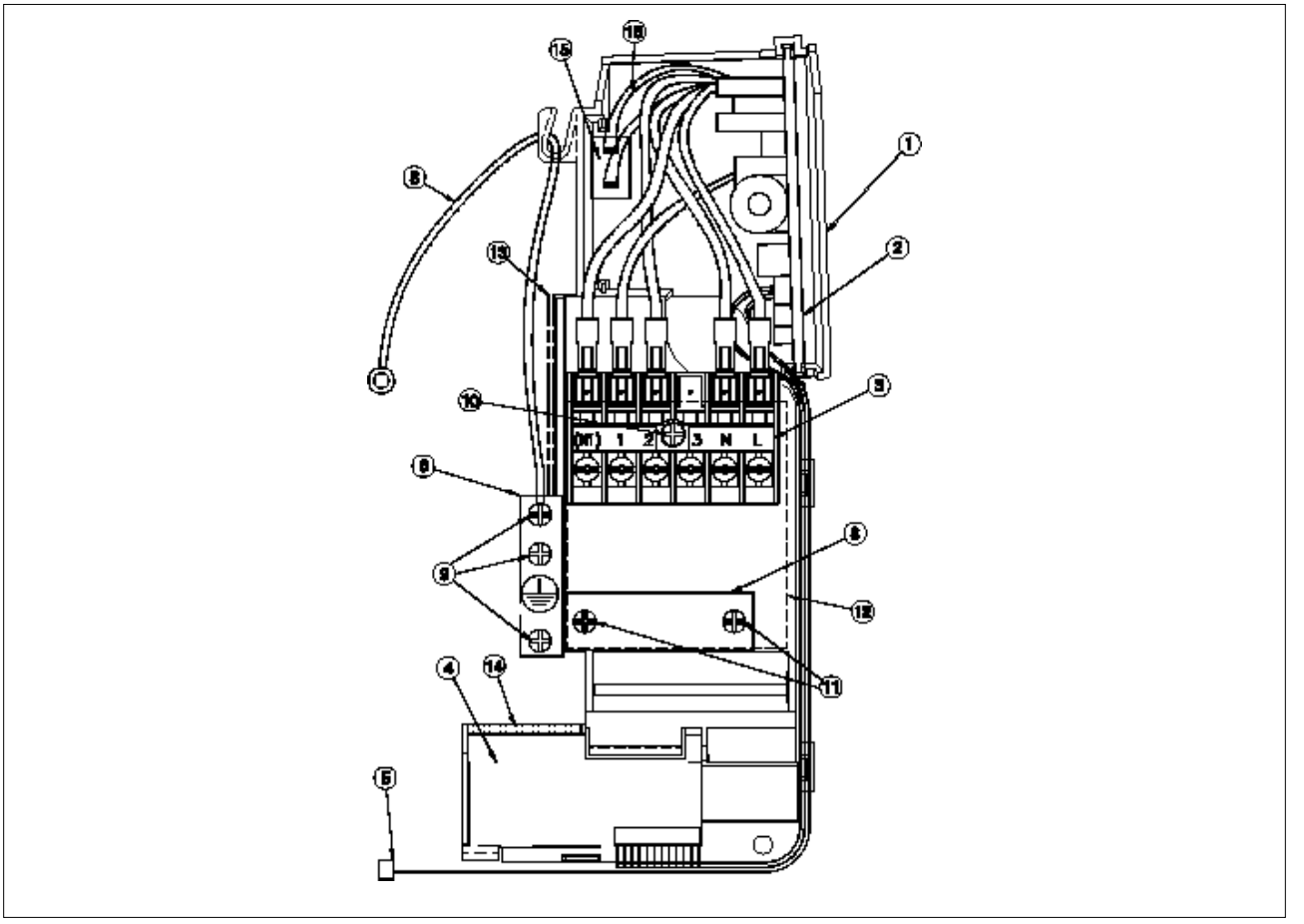
6-3-1 Remote Control : (DB93-00251L)



■ Parts List

No	Description	Q'TY	Remark
1	INLAY LCD	1	
2	CASE TOP	1	
3	LCD	1	
4	KEY RUBBER	1	
5	ASS'Y PCB REMOCON	1	
6	CASE LOW	1	
7	BATTERY COVER	1	

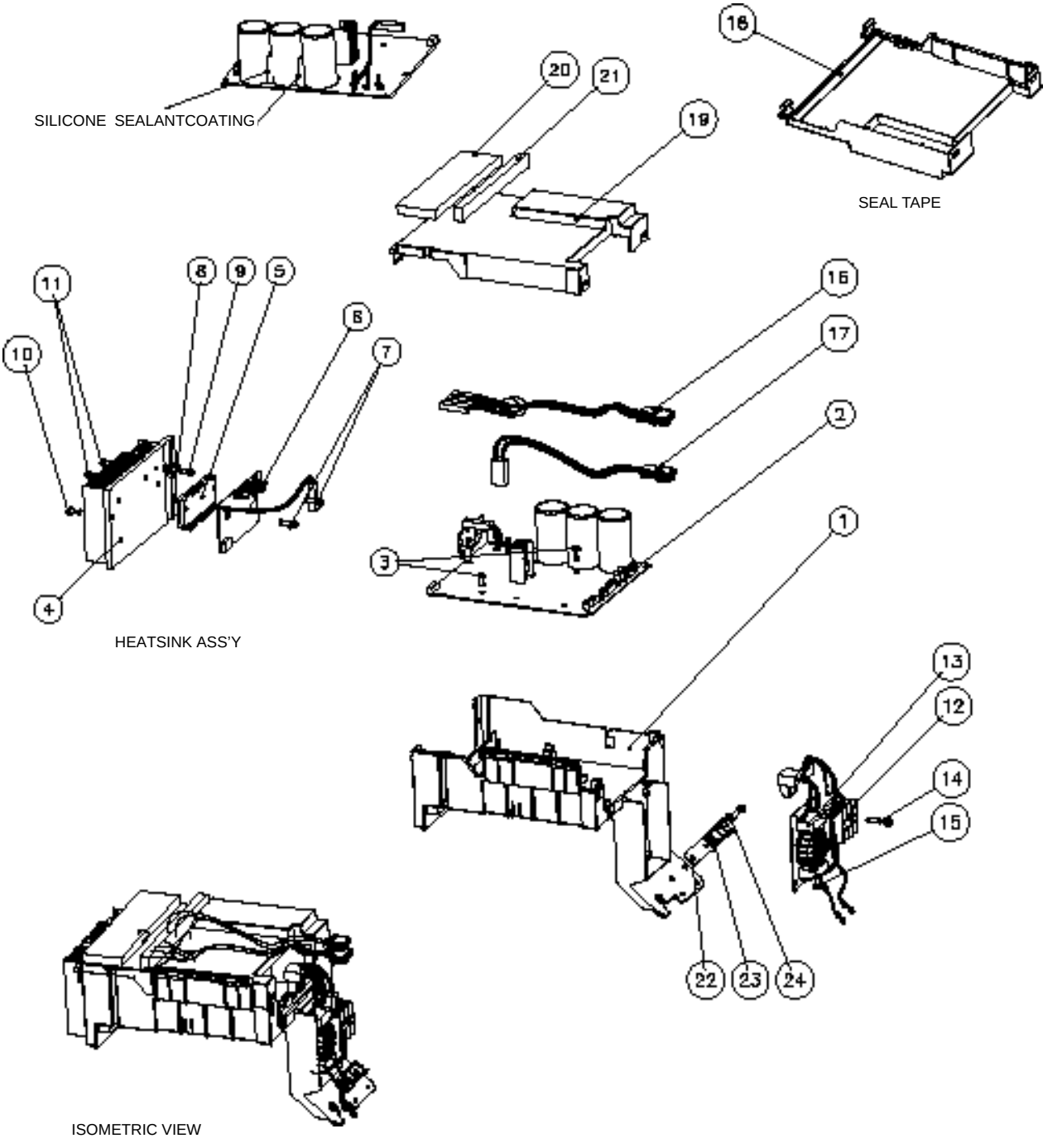
6-3-2 ASS'Y-Control In(Indoor unit) : DB93-00322A



■ Parts List

No	Description	Specification	Q'TY	Remark
1	HOLDER CONTROL	ABS		
2	ASS'Y MAIN PCB	AQV12A2ME		
3	ASS'Y TERMINAL BLOCK	6P		
4	ASS'Y DISPLAY PCB	AQV12A2ME		
5	CONNECTOR WIRE PCB U/D	STEP MOTOR DRIVE		
6	BRACKET EARTH	SGCC-M		
7	HOLDER WIRE CLAMP			
8	CONNECTOR WIRE EARTH	AWG#16		
9	SCREW	WP, TH + M4 x L8, ZPC(WHT), T.C		
10	SCREW	PH, M3 x L22		
11	SCREW	TH + M4 x L16, ZPC(WHT), SWRCH		
12	HOLDER CLAMP IN			
13	SEAL-PANEL FRONT RH			
14	SEAL-H/CONTROL FRONT			
15	MF CAPACITOR	1.2μF/450V		
16	CONNECTOR WIRE MF CAPACITOR	2P		

6-3-3 ASS'Y-Control-Out(Outdoor unit) : DB93-00325A



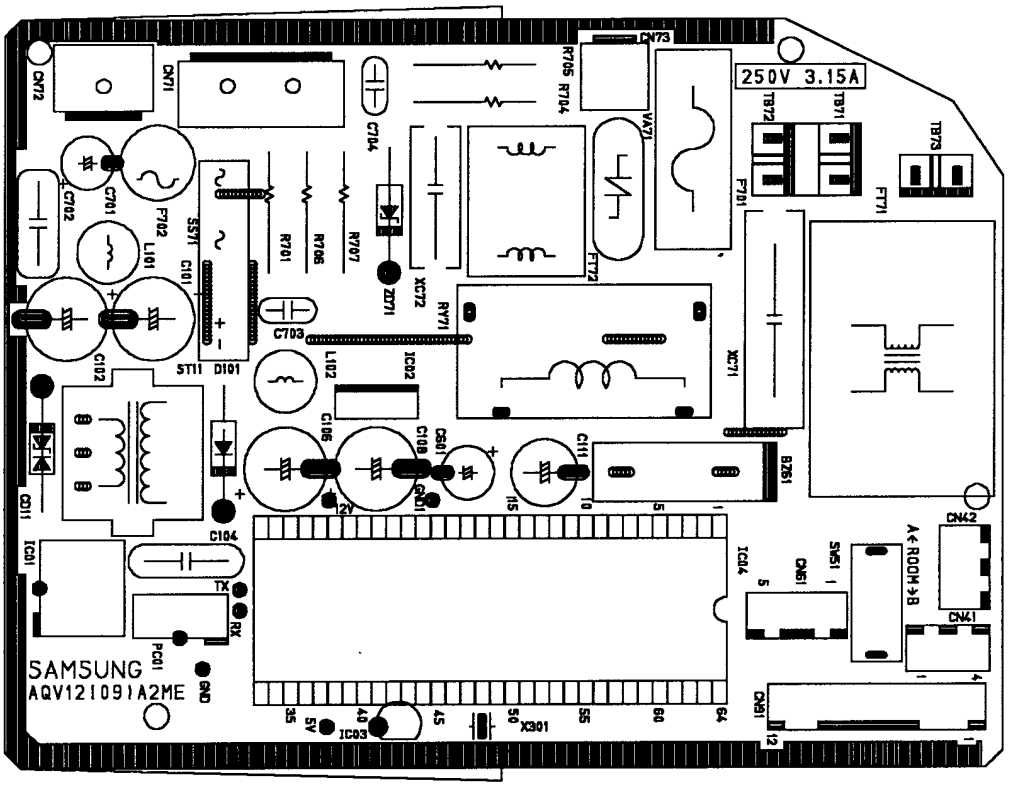
■ Parts List

No	Description	Specification	Q'TY	Remark
1	CASE-MAIN	ABS	1	
2	ASS'Y PCB MAIN OUT	HA1-B15SAI	1	
3	SCREW-TAPPING	M4 x 10 2S PH +	2	
4	HEAT-SINK	163 x 64 x 41.7	1	HEAT SINK ASS'Y
5	1GBT PS21245	MIT 600V, 20A	1	
6	ASS'Y PCB IPM	HA1-B15SAI	1	
7	SCREW-MACHINE	M4 x 16 WSP PH +	2	
8	THERMISTOR	PTS - K51F - OS3	1	
9	SCREW-MACHINE	M3 x 10 WSP PH +	1	
10	SCREW-MACHINE	M4 x 16 WSP PH +	2	
11	SCREW-MACHINE	M3 x 16 WSP PH +	2	
12	POWER CONNECTOR	CBF - HARNESS	1	
13	ASS'Y PCB EMI FILTER		1	
14	SCREW-MACHINE	M4 x 25 WSP PH +	1	
15	SCREW-TAPPING	M4 x 10 2S PH +	2	
16	COMPRESSOR CONNECTOR	CBF-HARNESS	1	
17	REACTOR CONNECTOR	CBF-HARNESS	1	
18	SEAL TAPE	FOAM LEX 2mm	1	
19	CASE-FRONT	ABS	1	
20	SEAL PAD	FOAM PE 10mm	1	
21	SEAL PAD 2	FOAM PE 15mm	1	
22	RUBBER CLAMP	NBR	1	
23	HOLDER-WIRE	ABS	1	
24	SCREW-MACHINE	M4 x 16 WSP PH +	2	

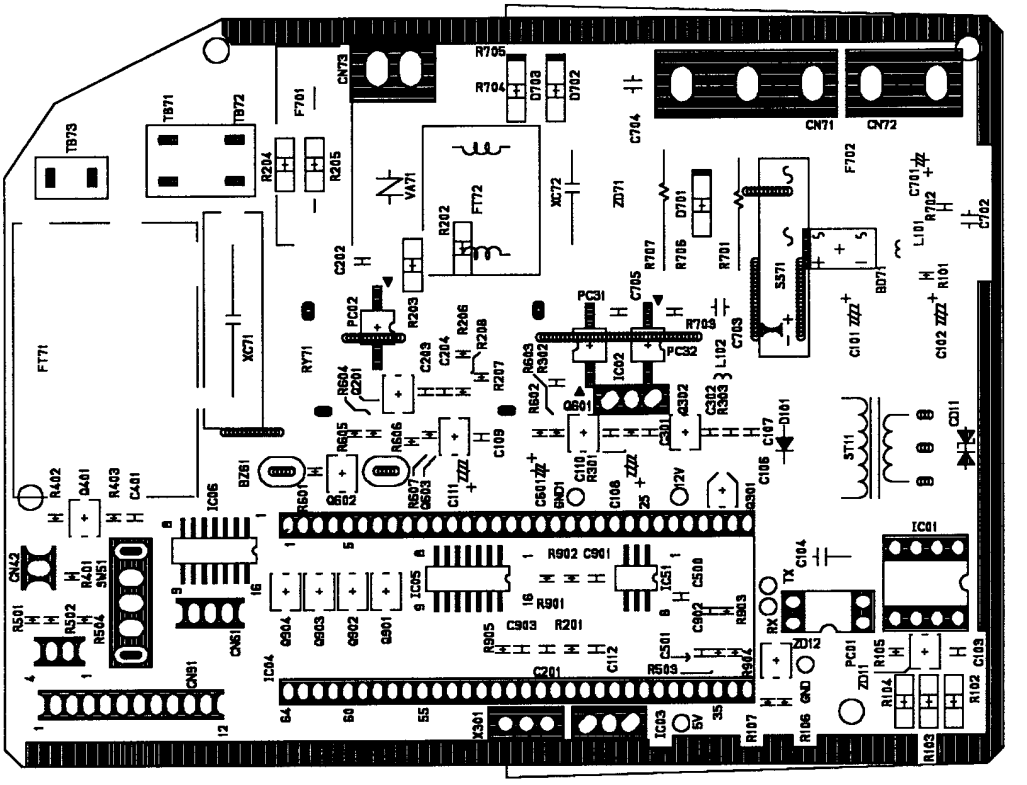
7. PCB Diagrams

7-1 ASS'Y PCB-IN : DB93-00323A

■ TOP



■ BOTTOM

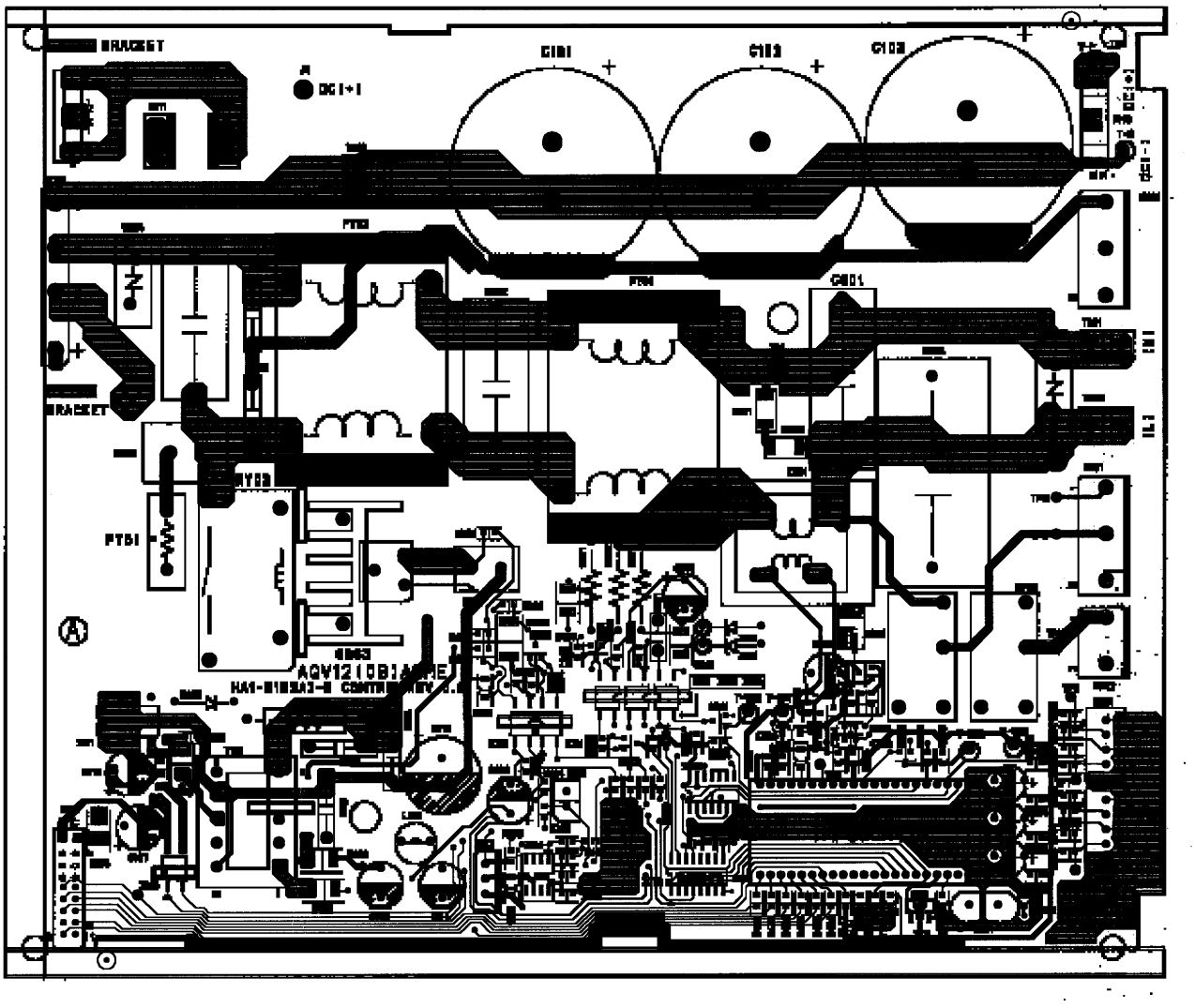


■ PART LIST

No	Design Location	Description	Specification	Q'TY
1		PCB-MAIN	FR4, 240 x 197	1
2	IC04	IC-MCU	uPD780022CW	1
3	IC05, IC06	IC DRIVE	ULN2003AFW	2
4	IC51	EEPROM	93LC56B-I/SN	1
5	PC02	PHOTO COUPLER	TLP 180(GB-TPL)	1
6	PC01	PHOTO COUPLER	PC817	1
7	PC31, PC32	PHOTO COUPLER	TLP181	2
8	Q603	TR SMALL SIGNAL	MMST2907A	1
9	Q201, Q401, Q602	TR SMALL SIGNAL	2SC2412K	3
10	Q901, Q902, Q903, Q904	TR DIGITAL	DTA114EKA	4
11	Q301, Q302, Q601	TR DIGITAL	DTC114EKA	3
12	BD71	DIODE BRIDGE	DF06S	1
13	ZD12	DIODE-ZENER	BZX84-C11	1
14	ZD11	DIODE-ZENER	BZX84-C3V6	1
15	ZD71	DIODE-ZENER	1N4749(ZD24V)	1
16	SS71	SSR	G3MB202PL	1
17	IC01	TR SWITCH	TNY255P	1
18	IC02	IC VLOT REGULATOR	KA7805A	1
19	IC03	IC-RESET	KA7533Z	1
20	D701, D702, D703	DIODE-RECT	MRA4005T3	3
21	D101	FR-DIODE	UG2B	1
22	CD11	T.V.S	ST02D-200	1
23	VA71	VARISTOR	INR14D471K-BS	1
24	X301	RESONATOR CERAMIC	4MHZ	1
25	ST11	SW TRANS	EI 1916, SHIELD	1
26	FT71	COIL	LSA 13024	1
27	FT72	COIL	LS403110	1
28	L101	COIL	5mH/50mA	1
29	L102	COIL	4.7uH/0.5A	1
30	RY71	RELAY POWER	UKH-12S	1
31	BZ61	BUZZER	CBE2220BA	1
32	F701	HOLDER FUSE	FH-51H	1
33	F701	FUSE	250V, 3.15A	1
34	F702	FUSE	250V, 1A	1
35	TB71, TB72, TB73	TERMINAL-TAB	YTR-250, 250V, 15A	3
36	CN71	CONNECTOR HEADER	YW396-05AV WHT	1
37	CN72	CONNECTOR HEADER	YW396-03AV WHT	1
38	CN73	CONNECTOR HEADER	YW396-02V WHT	1
39	CN91	CONNECTOR HEADER	SMW200-12 WHT	1
40	CN61	CONNECTOR HEADER	SMW200-5P WHT	1
41	CN42	CONNECTOR HEADER	SMW250-3P BUL	1
42	CN41	CONNECTOR HEADER	SMW200-4P WHT	1
43	C106	C-AL	SD 1000µF, 25V	1
44	C108	C-AL	SD 470µF, 25V	1
45	C601, C701	C-AL	47µF, 50V	2
46	C111	C-AL	470µF, 16V	1
47	C101, C102	C-ELEC	SD 6.8µF/450V	2
48	C104	C-CERAMIC	SDE 2G 222M	1
49	C702	C-FILM	2J103K	1
50	C703, C704	C-FILM	2A472	2
51	XC71	C-FILM	220nK 275V X2	1
52	XC72	C-FILM	100nK 275V X2	1
53	C103, 107, 109, 110, 112, 201, 202, 302, 500, 501, 901, 902	C-CHIP	CS2012Y5V 104Z500NR	12
54	C203, C204, C401, C705	C-CHIP	CS2012Y5V 103Z500NR	4
55	C301, C903	C-CHIP	CS2012X7R 102K500NR	2
56	R102, R103, R104	R-CHIP	MCR 18EZHJ224	3
57	R202, R203, R204, R205, R702	R-CHIP	MCR 18EZHJ104	5
58	R501, R903	R-CHIP	MCR 10EZHF6801	2
59	R206, R303, R601, R602, R607, R902	R-CHIP	MCR 10EZHJ103	6
60	R402	R-CHIP	MCR 10EZHJ682	1
61	R101, R603, R703, R901	R-CHIP	MCR 10EZHJ472	4
62	R201, R207, R208, R301, R401, R403, R905	R-CHIP	MCR 10EZHJ102	7
63	R606	R-CHIP	MCR 10EZHJ561	1
64	R105, R302, R604, R605	R-CHIP	MCR 10EZHJ471	4
65	R502, R503, R504, R904	R-CHIP	MCR 10EZHJ331	4
66	R106, R107	R-CHIP	MCR 10EZHJ221	2
67	R704, R705	R-CARBON	2W 10K-J	2
68	R701, R706, R707	R-CARBON	2W 82K-J	3

7-2 ASS'Y PCB Control-Out : DB93-00324A

■ TOP



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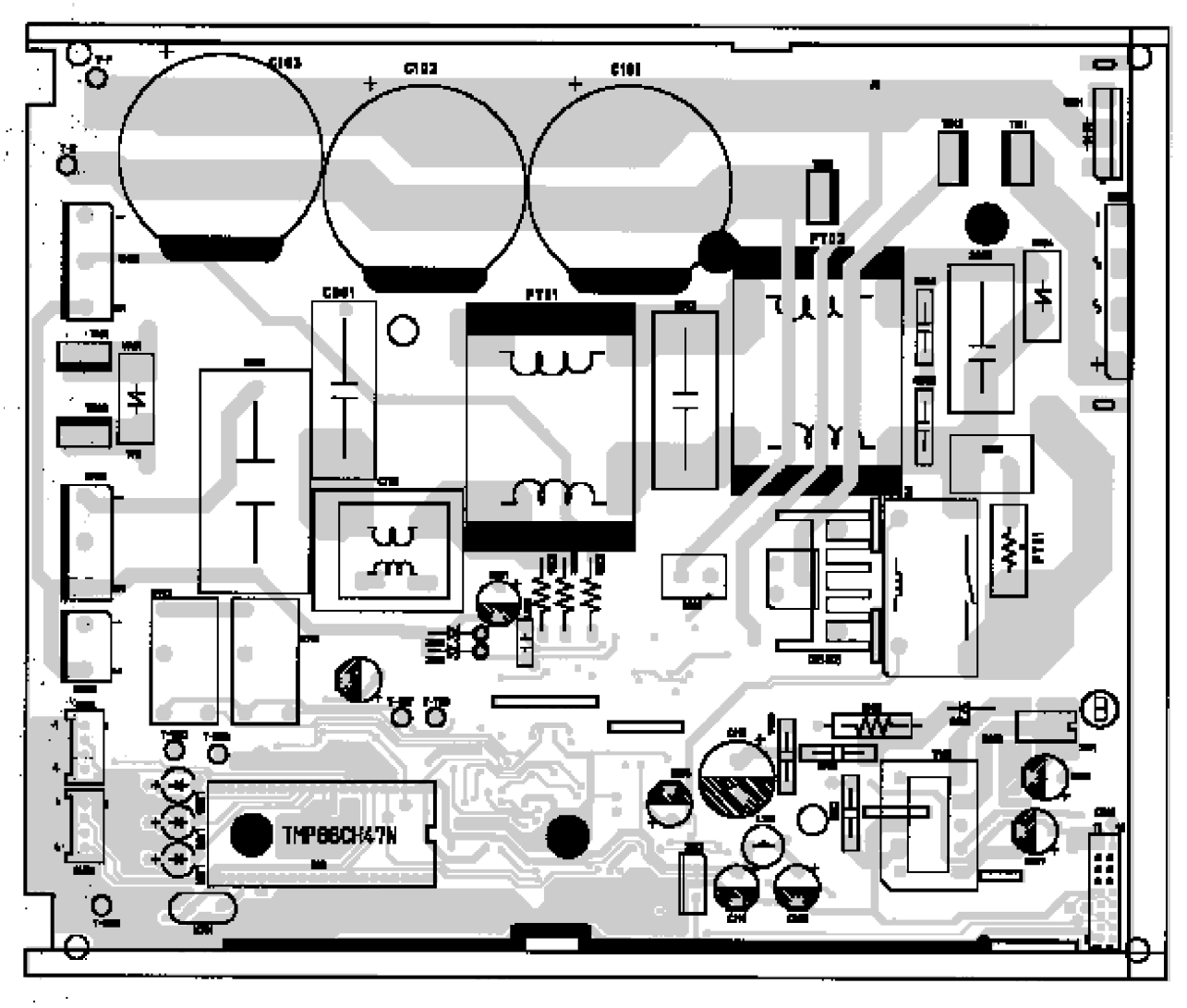

■ PART LIST

No	Design Location	Description	Specification	Q'TY
1	BD01	DIODE-BRIDGE	TS25PO5G-10, 7, SIP-4, BK	1
2	IPM	IGBT	PS21245, MIT, 600V, 20A	1
3	Q803	TR-IGBT	IRG4BC30F(004), TO-220AB, IR	1
4	IC6	IC-MICRO	TMP88CH47N, 42P, 600MIL, SOP	1
5	IC12	IC-REG	KA7805, TO-220, SEC	1
6	IC11	IC-PWM CONTROLLER	TOP222P, DIP, 8P, POWER1	1
7	PT01	THERMISTOR-PTC	J512Q24E270M265, JAHWA	1
8	X701	RESONATOR-CRYSTAL	HC-49/S, 12.288MHz	1
9	R102	R-METAL OXIDE(S)	47Kohm, 5%, 3W, AA, TP	1
10	R801	R-CEMENT(S)	0, 045ohm, 5%, 3W, CB, BK, 12x8x25	1
11	R002	R-CEMENT(S)	200ohm, 5%, 5W, CB, BK, 13x9x25.5	1
12	C003, C004, C104, C105, C113	C-CERAMIC, DISC	EKB3D222K12FF1, TP	5
13	C006	C-FILM, MPPF	RMES-45H012UA, SAMHWA	1
14	C001	C-FILM, MPPF	680nF, 10%, 275V, BK, 31x11x21	1
15	C005	C-FILM, MPPF	330nF, 10%, 275V, TP, 26x8.5x18m	1
16	C002	C-FILM, MPPF	470nF, 10%, 275V, BK, 31.0x9.0x1	1
17	C101, C102, C103	C-AL	680µF, 20%, 400V, WT, 2PIN, BK, 35x60mm	3
18	C116	C-AL	10µF, 20%, 450V, LZ, BK, 12.5x25mm, 5	1
19	RY01, RY02	RELAY-MINIATURE	JQ1A-12V	2
20	RY03	RELAY-POWER	UKH-12S, 12VDC, YUYU	1
21	CN41	CONNECTOR-SOCKET	DF11-18DS-2DSA	1
22	CN02	CONNECTOR-HEADER	YW396-03AV, WHT, YEONH	1
23	CN31	CONNECTOR-HEADER	YW396-05AV, BLU, YEONH	1
24	CN01	CONNECTOR-HEADER	YW396-05AV, WHT, YEONH	1
25	CN21	CONNECTOR-HEADER	5267-02A	1
26	CN51	CONNECTOR-HEADER	SMW250-04 RED, YEONH	1
27	CN52	CONNECTOR-HEADER	SMW250-04 WHT, YEONH	1
28	TB01, TB02, TB11, TB12, TB13	CONNECTOR-TERMINAL	YTR250, YEONH	5
29	VA01, VA04	VARISTER	470V, 0.6W, 50A, 1.4MM, 1NRI4D47K	2
30	CT51	TRANS-CURRENT	EE25x20, 26.0x21.0x27.0	1
31	T101	TRANS-SWG	EE-2229, 22.5x38.0x16.5	1
32	FT01, FT02	COIL CHOKE	LS614046, 4.6mH, 43x32x29mm	2
33	J1	CBF-HARNESS	#16, FT1 16AWG	1
34	HEATSIN	HEAT SINK	A6063, 23.5x40x15	1
35	ZD31	DIODE-ZENER	1N4751, 5%, 1000MW, DO-41	1
36	ZD21	DIODE-ZENER	1N4749A, 24V, 5%, 1W, DO-41	1
37	LED2	LED	LTL-4233, TAPING LITEON	1
38	LED3	LED	LTL-4213, TAPING LITEON	1
39	LED1	LED	LTL-4253, TAPING LITEON	1
40	L101	COIL-CHOKE	10uH(DR 6.5x7.5)	1
41	R202	R-METAL OXIDE(S)	100Kohm, 5%. 2W, AA, TP	1
42	R201	R-METAL OXIDE(S)	47Kohm, 5%. 2W, AA, TP, 4.3	1
43	R301	R-METAL OXIDE(S)	5.6Kohm, 5%, 2W, AA, TP	1
44	C301	C-FILM, PEF	5TY2ARB103KAN, TP	1
45	C108	C-AL	1µF, 20%, 50V, LZ, TP, 5x11mm, 5	1
46	C107, C109, C110	C-AL	LXV25VB220M, 220µF, TP, 8x11.5mm	2
47	C507	C-AL	LXV25V100M, 100µF, TP, 8x11.5mm, 5	1
48	C112, C201	C-AL	LXV35V47M, 47µF, 35V, TP, 6.3x11.5mm, 5	2
49	D102	DIODE-SWITCH	1N4937, 600V, 1A, DO-35, HITA	1
50	D103, D104, D105, D106	DIODE-RECTIFIER	D1FL20U, 200V, 1.1A, 1F, TP	4
51	D201, D301	DIODE-RECTIFIER	D1FL40-4063, 400V, 1F	2
52	D501, D502	DIODE-ARRAT	KDS226, 80V, 300mA, C2-3, SOT-23	2
53	Q802	TR-SMALL SIGNAL	KTC3875Y, NPN, 150mW, SOT-2	1
54	Q201, Q202, Q301, Q302, Q801	TR-DIGITAL	KRC102S, NPN, 200mW, 10K-10K, SOT	5
55	IC13, IC21, IC31, IC32, IC81, IC82	PHOTO-COUPLER	TLP181(GRH-TPL), SOP, TP	6
56	IC72	IC-DRIVER	TD62004FB, SOP, 16P, 173MIL	1
57	IC14	IC-VOL REF	KA431DTF, SOP, 8P, 300MIL	1
58	IC71	IC-VOLT	RH5VL45CA-T1, RICOH	1
59	R306	R-CHIP	RC2012J561CS	1
60	R407, R508, R808, R809, R810, R206	R-CHIP	RC2012J103CS	6
61	R401	R-CHIP	RC2012F153CS	1
62	R501, R504	R-CHIP	RC2012F183CS	2
63	R106, R901, R902, R903, R205	R-CHIP	RC2012J102CS	5
64	R805, R817	R-CHIP	RC2012 F222CS	2
65	R204	R-CHIP	RC2012J203CS	1
66	R802	R-CHIP	RC2012J221CS	1
67	R502, R503, R505	R-CHIP	RC2012 F243CS	3
68	R107, R806	R-CHIP	RC2012J332CS	2
69	R203, R302, R305, R804	R-CHIP	RC2012J472CS	4
70	R303, R304	R-CHIP	RC2012J471CS	2
71	R108	R-CHIP	RC2012F682CS, 6.8K	1
72	R105	R-CHIP	RC2012J 6P8CS, 6.8OHM	1
73	R401, R402, R403, R404, R405, R406	R-CHIP	RC2012J681CS	6
74	R103, R109, R507	R-CHIP	RC2012F182CS	3
75	R506	R-CHIP	RC2012F681CS	1
76	R803	R-CHIP	RK73K3ATE222J, 1W, 6432	1
77	R001, R003	R-CHIP	470Kohm, 5%, 1/2W, DA, 5025	2
78	R101, R110	R-CHIP	RK73K3ATE184J, 1W, 180Kohm	2
79	C106, C114, C202, C501, C502, C503, C504, C505, C703, C704, C705, C706, C802, C803	C-CERAMIC, CHIP	CL21B104KBNC	14
80	C302, C304, C401	C-CERAMIC, CHIP	CL21B103KBNC	3
81	C303, C203	C-CERAMIC, CHIP	CL21B102KBNC	2
82	C701, C702	C-CERAMIC, CHIP	CL21C220JBNC	2
83	C506, C801, C111	C-CERAMIC, CHIP	1µF, 20%, 50V, X7R, TP, 3216	3
84	IC83	IC-LOGIC	74HCT00D, SOP-14, TI	1
85		PCB	FR4, GREEN, HA1-B15SAI CONTROL	1

7-3 ASS'Y PCB IPM : DB93-00353A

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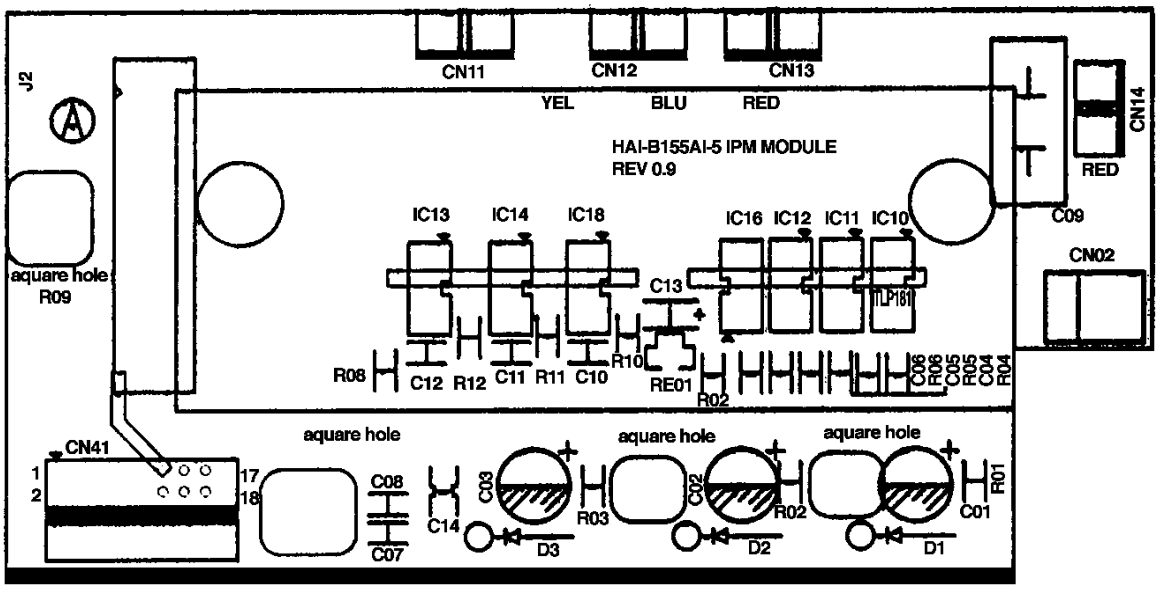

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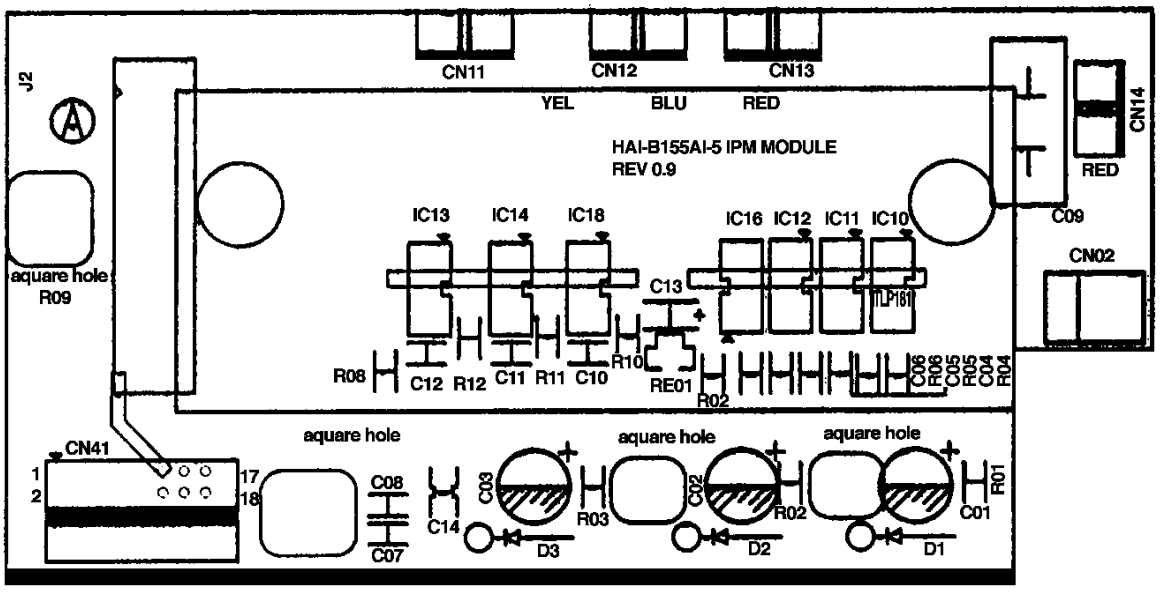

■ PART LIST

No	Design Location	Description	Specification	Q'TY
1	IPM	IGBT	PS21245, MIT, 600V, 20A	1
2	R09	R-CEMENT(S)	0.015ohm, 5%, 7W, CA, BK, 35x9.5	1
3	C09	C-FILM, MPEF	6TM2JRB104K, TP	1
4	CN41	CONNECTOR-HEADER	DF11-18DP-2DS	1
5	CN02	CONNECTOR-HEADER	SMAW200-02P, YEONH	1
6	CN11, CN12, CN13, CN14	CONNECTOR-TERMINAL	YTR250, YEONH	4
7	J2	CBF-HARNESS	#16, FT1 16AWG	1
8	C01, C02, C03	C-AL	LXV50V22M, 22µF, TP, 6.3x11mm, 5	3
9	D1, D2, D3	DIODE-SWITCH	1N4937, 600V, 1A, DO-35, HITA	3
10	IC10, IC11, IC12, IC13, IC14, IC15, IC16	PHOTO-COUPLER	TLP181(GRH-TPL), SOP, TP	7
11	REG1	IC-VOLT/REG	KIA78L05F	1
12	R08	R-CHIP	RC2012J222CS	1
13	R07	R-CHIP	RC2012J271CS	1
14	R01, R02, R03,	R-CHIP	RC2012J330CS	3
15	R04, R05, R06, R10, R11, R12	R-CHIP	RC2012J471CS	6
16	C04, C05, C06, C10, C11, C12	C-CERAMIC, CHIP	CL21B102KBNC	6
17	C07	C-CERAMIC, CHIP	CL21B222KBNC	1
18	C08	C-CERAMIC, CHIP	CL21B223KBNC	1
19	C13, C14	C-CERAMIC, CHIP	1µF, 20%, 50V, X7R, TP, 3216	2
20		PCB	FR4, GREEN, HA1-B15SAI IPM	1

7-4 ASS'Y EMI-FILTER PCB : DB93-00358A

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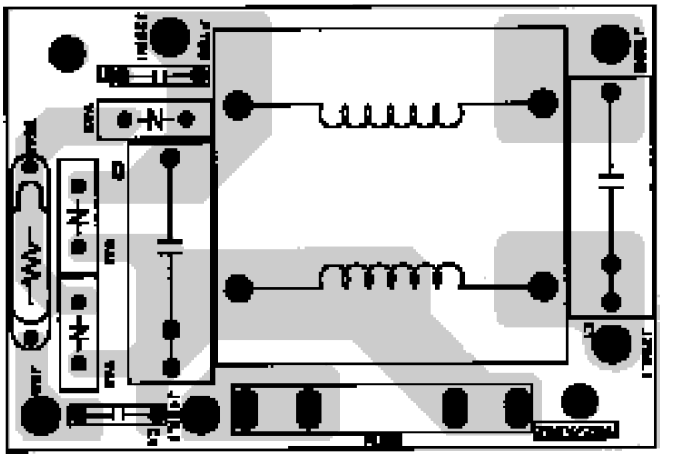

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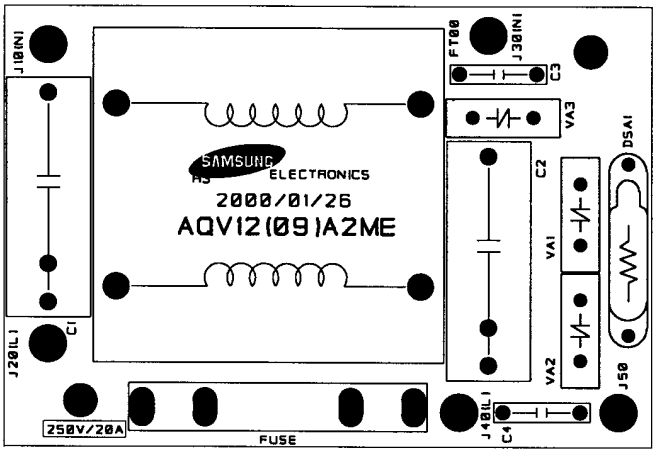
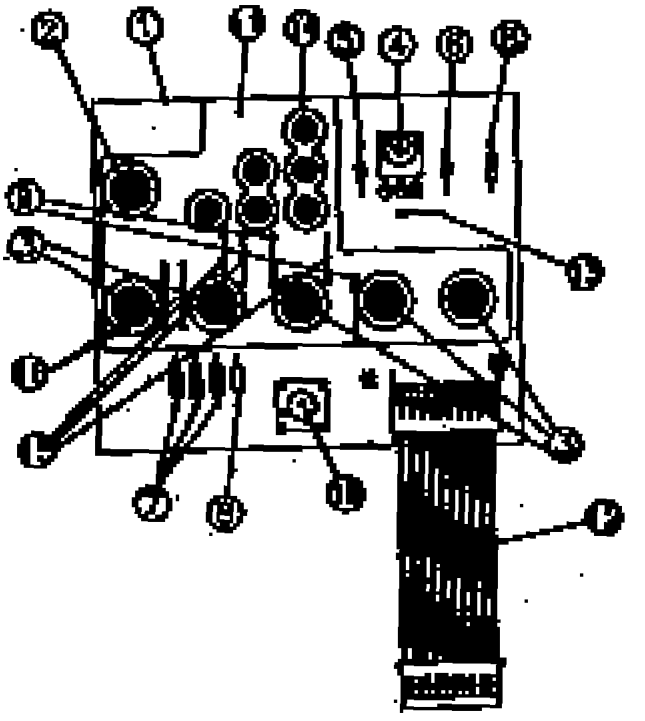


■ PART LIST

No	Design Location	Description	Specification	Q'TY
1	C1, C2	C-FILM, MPPF	680NF, 10%, 275V, BK, 31x11x21	1
2	C3, C4	C-CERAMIC, DISC	EKB3D222K12FF1, TP	2
3	VA1, VA2, VA3	VARISTER	470V, 0.6W, 50A, 14MM, INR14D47K	3
4	FTOO	COIL CHOKE	LH319024, 2.4mH, 15A	1
5	FUSE	FUSE-FERRULE	65TS-150-H, TRIAD	1
6	FUSE	FUSE CLIP	FC61B	2
7	DSA1	SURGE ABSORBER	3600V, ± 600V, 2000A, 100A	1
8	J10(N)	CBF-HARNESS	#16, FT1 16AWG	1
9	J20(L)	CBF-HARNESS	#16, FT1 16AWG	1
10	J30(N)	CBF-HARNESS	#16, FT1 16AWG	1
11	J40(L)	CBF-HARNESS	#16, FT1 16AWG	1
12	J50	CBF-HARNESS	#16, FT1 16AWG	1
13		PCB	FR-4, 86x58, T1, 6	1

7-5 ASS'Y DISPLAY(DB93-00268B)

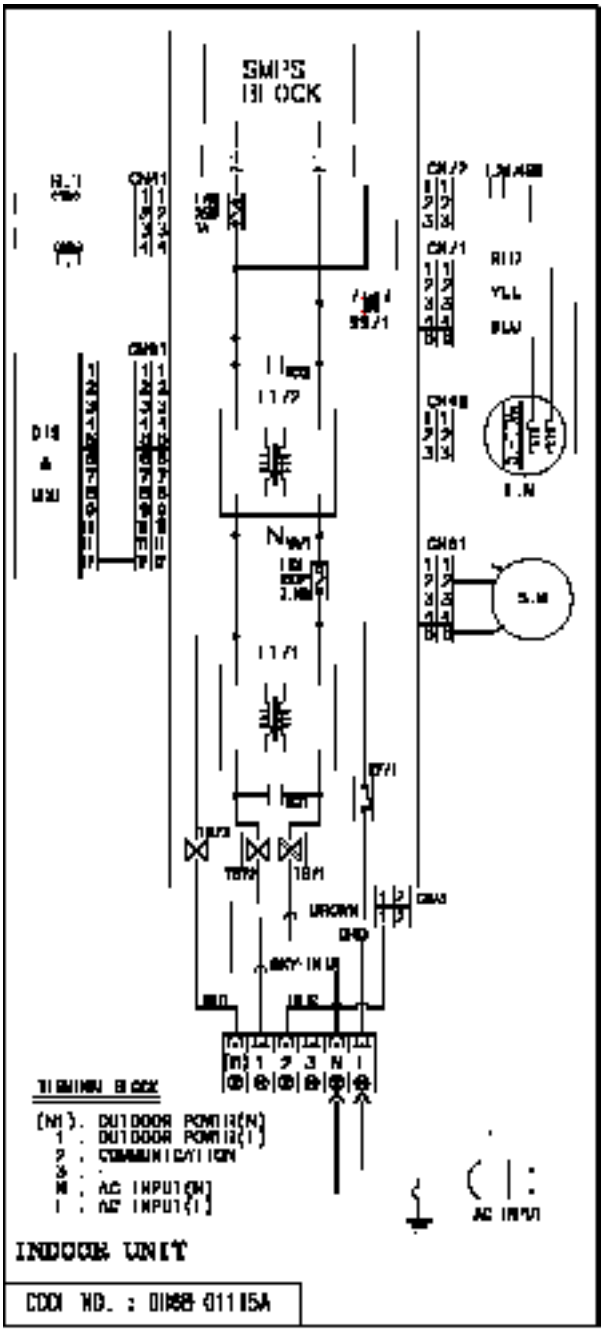


■ PART LIST

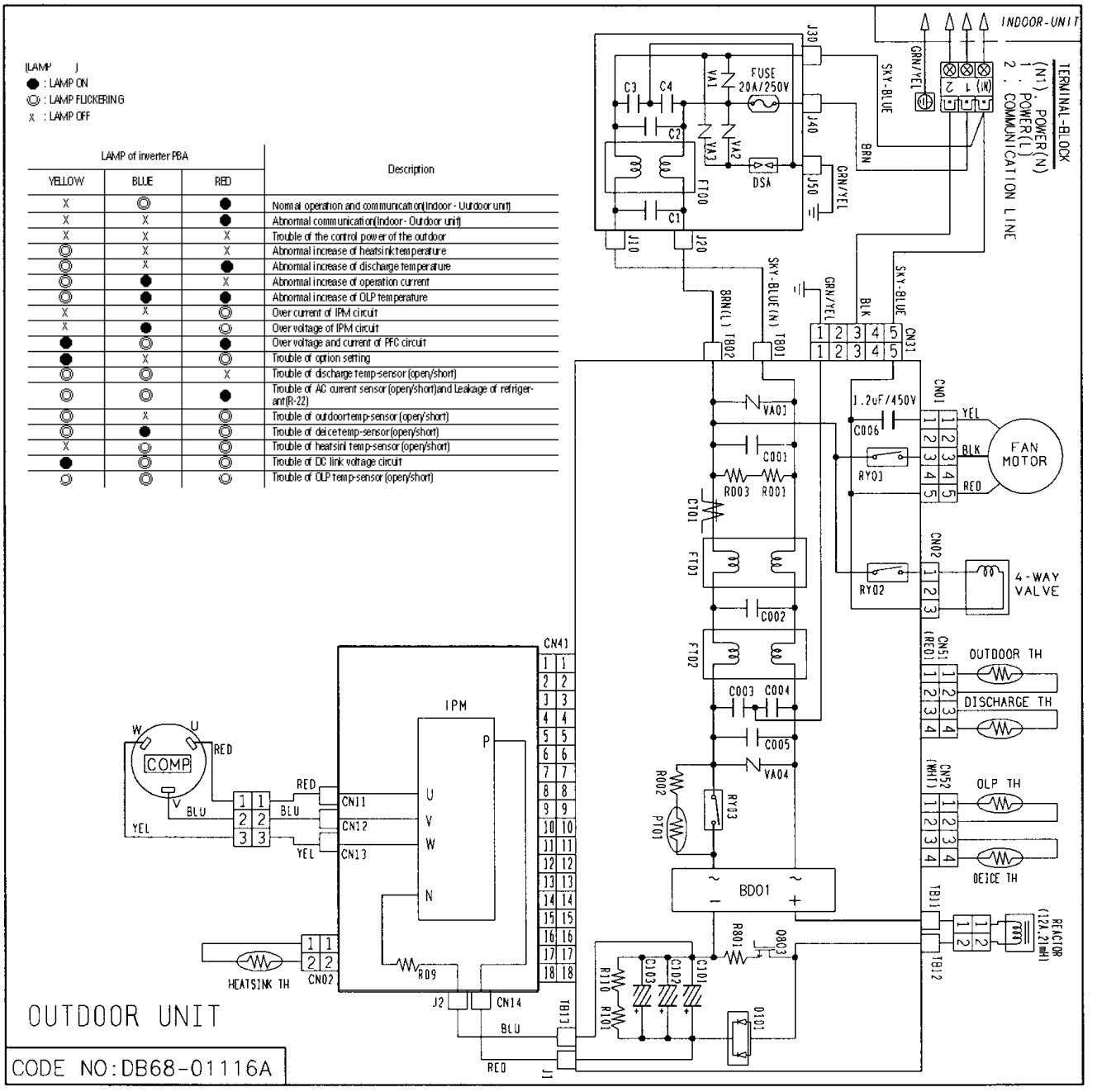
No	Description	Specification	Q'TY
1	PCB-DISPLAY	FR-1 T1.6	1
2	LED-LAMP	SY5511 (YEL)	1
3	LED-LAMP	SO5511 (ORG)	5
4	MODULE REMOCON	KSM-313TH5	1
5	C-CERAMIC	CA 0A 50V 102K	1
6	C-CERAMIC	CA 0A 50V 104Z	1
7	R-CARBON	470 1/2W 5%	3
8	DIODE SWITCHING	1N4148	1
9	JUMP-WIRE	10mm	2
10	TACT SWITCH	KPT-1105A	1
11	COVER DISPLAY UP	ABS	1
12	C/W DIS & HODULE	UL1007 AWG/26/10	1
13	JUMP-WIRE	7.5mm	0
14	LED-LAMP	SR3511(RED)	6
15	JUMP-WIRE	7.5mm	3
16	JUMP-WIRE	10mm	2

8. Wiring Diagrams

8-1 Indoor Unit



8-2 Outdoor Unit



UPDA TE LOG SHEET				
Application date	Page	Part#	Note(Cause & Solution)	S/Bulletin#

Use this page to keep any special servicing information. (Service Bulletin, etc.)
If only parts number changes, Just change parts number directly on parts list.
And if you need more information, please see the service bulletin

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